The IRON AGE

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The Two Critical Years

IT'S the middle-of-the-roader who swings elections. Today's rip-tide of Republican sentiment after 15 years of melancholy banishment to the political hinterland does not mean that the middle-of-the-roader has entirely forsaken the promise of remaking America according to plan, and has permanently joined the ranks of rugged individualists who hold that untrammeled private enterprise is the answer to all of today's economic stresses. Rather, the middle-of-the-roader has found a mid-term election a convenient means of determining whether after 15 years of criticism from the safety of the sidelines, the Republican Party can better fuse ever-recurrent political and economic conflicts into satisfying and workable compromises.

Obviously, an enervated, disillusioned and leaderless Democratic Party was finding the going too tough, and Mr. Truman joins the ranks of Taft, Wilson and Hoover as an isolated and impotent executive.

But two years from now the power of the people will again make itself felt at the polls. It would be foolhardy indeed for Republican leadership to translate current victory automatically into victory in the presidential elections of 1948. For, to the victor goes the responsibility—and the credit and the blame! The next two years are going to bring forth an array of moral, political and economic problems that will try every bit of skill and judgment that responsible Republican leadership can mobilize.

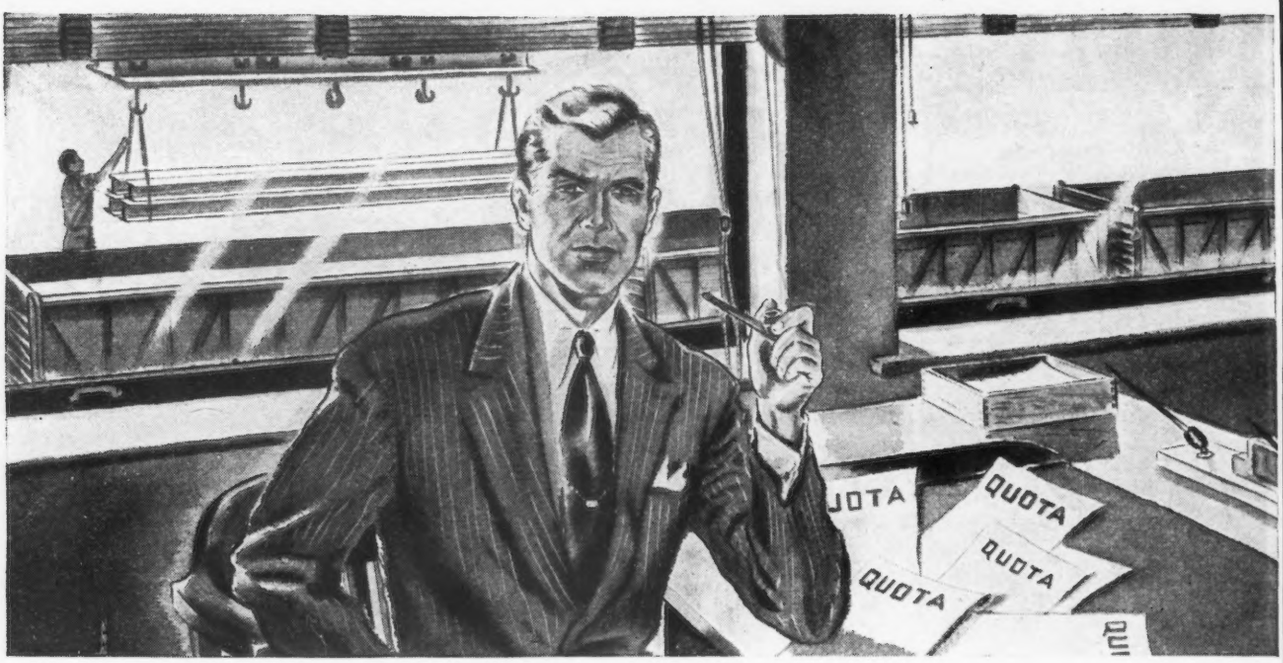
The task is doubly difficult in that the next two years may hardly show the imprint of even the strongest Republican constructive program to halt the upward spiral of prices, to weld management and labor into a productive team, and to inject order into the country's fiscal policies. The American legislative system, with its innumerable checks and counterchecks, is a hazardous maze at best, which only reaches its frustrating apex with an executive suffering a vote of no-confidence from the electorate and a legislature controlled by a newly-triumphant opposition. The next two years will be a fight for public approval. Mr. Truman can hardly resist the opportunity to harry an opposition legislature with popular bills and the counterflow will most likely suffer summary treatment in the Oval Room.

So, in the domestic field, it is 1918 all over again, with the New Deal just a chapter in a history book, like Wilson's New Freedom. In the foreign field the country can be thankful that it isn't a repetition of 1918 when foreign policy flipped into a complete reversal. Fortunately the catch-phrase of politics stopping at the border has become a reality, and bi-partisan support of international political objectives assures a heartening continuity.

But in foreign economic policies there are bound to be some drastic changes in pace, which will affect every other country's economy and enter into every foreign political and economic calculation.

The two-year trial by fire therefore becomes not only a domestic issue whereby Republican leadership will be judged by a people emotionally exhausted by the pace set by Mr. Roosevelt. Judgment will be constant and searching in all capitals of the world.

T. W. Lippert



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► Anyone who is planning on running a new car with atomic power had better figure on surrounding the passengers with 6 ft of concrete. That is the only way they can be protected from radiation, says Dr. Karl T. Compton, president of MIT.

► A gas welding technique employing no welding rods has been developed by a steel company for buttwelding the ends of high silicon sheets so that they may be coiled for continuous operation of lamination stamping equipment. The welds need no trimming and are so uniform in thickness, relative to the original sheet thickness, that lamination producers stamp parts with the weld running through them.

► Bus designers predict an increasing trend to electric trolley type buses for urban and suburban service on the basis of low operating cost, low maintenance and greater flexibility in traffic.

► A major steel company that installed a multiple roll type ultra-thin gage sheet mill for research and development work has found demand extremely high for high silicon and stainless steels in these thicknesses. The mill, set up in the company's research laboratory, is now in steady commercial production.

► A Connecticut powder metallurgy firm has developed an industrial use for fools' gold, iron pyrites. Discovering that it was magnetic, with about the same characteristics as magnetic oxide, the company is now selling it to most of the makers of intermediate frequency transformer cores, used largely in radio sets.

► If OPA is discontinued completely the cost to the Government in furlough and accumulated pay is estimated at $20 million.

► Within 30 days a number of technical developments used quietly or first applied during the war will be announced to the public by the automobile industry. About a year has been required to iron out bugs in the new processes and developments and obtain patent protection.

► Estimated production of passenger car tires for replacement sale only is 53 to 54 million units in 1946--just about equal to two tires for every car on the road. Present production rate is 175 pct of normal prewar demand. One out of five cars may be off the road this winter for lack of batteries.

► A new method of cutting stainless, copper, Monel and other alloys by use of a tubular rod through which a stream of oxygen is fed to the arc has been developed by Arcos Corp. The operation is said to be extremely fast and does not require skilled operators.

► A new approach to the determination of hardenability of low and medium hardening steels has been developed by B. F. Shepherd, of Ingersoll-Rand. Economical and rapid specimen preparation, a high degree of accuracy and reproducibility are factors that speak well for this method. Already well past the experimental stage, this test is also being used to establish cooling rate data for various steels.

► The current struggle to see whether Wilson W. Wyatt will be successful in awarding the Chicago Dodge war plant to Lustron, Inc., for prefabricated housing construction is considered in Washington to be the crucial test of the Housing Administrator's authority. If Tucker gets the plant, awarded to him by WAA, to build motor cars instead, Mr. Wyatt's prestige will suffer.

► Some machine tool builders will bring out new models in July or August of 1947 to counteract the lull that usually preceded the Fall show. Meanwhile, one producer has a new machine slated for introduction within the next 60 days, reflecting substantial design changes over the company's wartime models.

► The installation of electric induction heating equipment for the heat treatment of cold-drawn and cold-finished steel bars is expected to afford a high degree of control of the heating and quenching cycle, with the yield of highly uniform physical properties. The mill installing the equipment expects to be able to use it on straight production run work.

► Another reason for postponement of the General Motors light car program is that the tooling cost was so high as to make the car impractical even if the necessary material had been available. It is understood that many important departures from standard machine tool practices were involved. GM is scheduled to take another look at the light car program about March 1.

► Two new high silicon steels with special grain orientation properties will be announced shortly by a midwestern steel producer. Properties of the steels will enable electrical equipment manufacturers to run greater power loads through transformers and similar equipment with a reduction in size of the units.

► Mexican Government sponsored industrial expansion has slowed down because of the inavailability of needed equipment. A tractor and truck engine plant has one 30-in. cupola installed in its foundry and is awaiting five more that are long overdue. The lack of all types of foundry equipment has slowed up the plant completion.

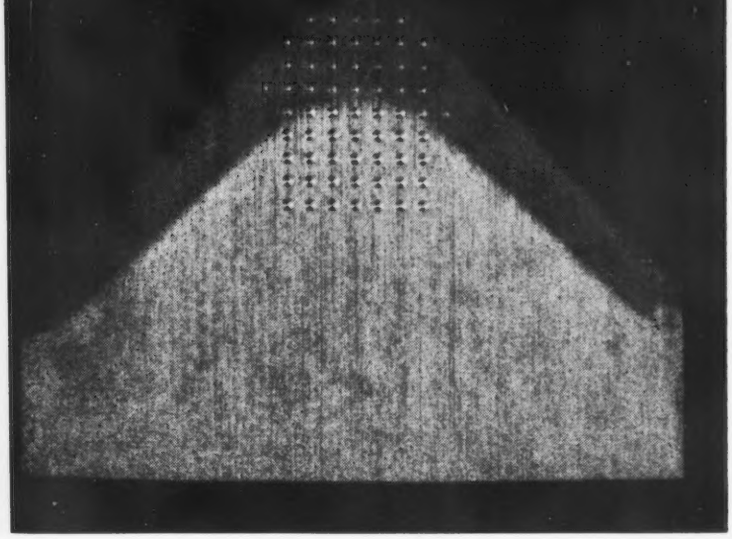

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FIG. 1—Wedge-shaped specimen used for P-V test showing differential between case and core of a quenched shallow hardening steel.

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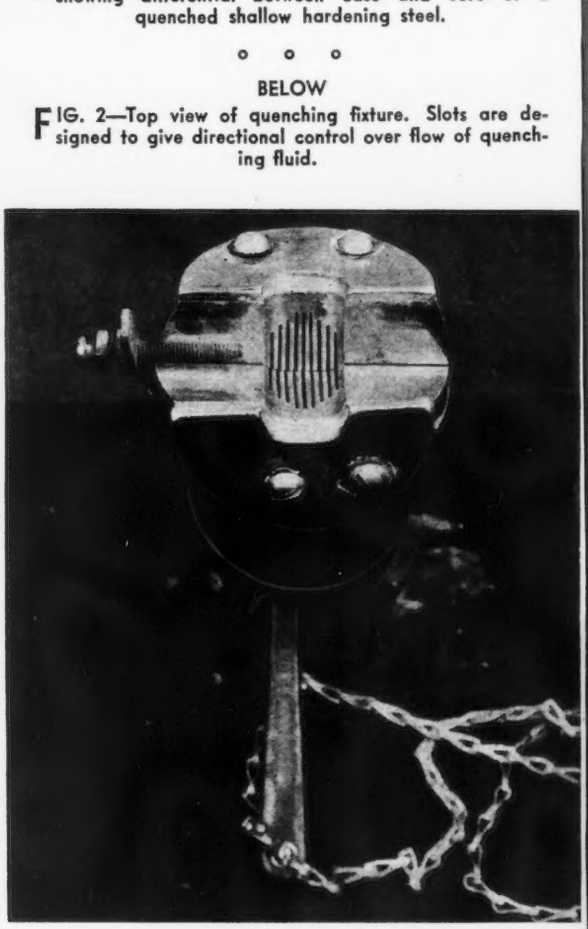
BELOW

FIG. 2—Top view of quenching fixture. Slots are designed to give directional control over flow of quenching fluid.



The P-V Test—

A New Hardenability Measure

o o o

By E. S. KOPECKI
Associate Editor

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A method for determining hardenability of low and medium hardening steels, whereby economy in sample preparation and excellent reproducibility in results have been attained, is proposed herein. The P-V test—symbolizing "penetration-velocity" or "penetration-V shape,"—designed for steels with critical cooling rates above 100°F per sec, eliminates the undesirable features inherent in present hardenabiltiy testing methods. Already past the experimental stage, the P-V test has proved useful in establishing cooling rate data of many steels.

BASED on the fact that the depth of hardening along the diagonal of a square bar is much greater than the depth normal to the flat face, the diagonal distance acts as a magnified measure of the depth of hardening, and the width of the transition zone between case and core is also greater, indicating that the cooling rate gradient is less steep along the diagonal.

With this in mind, B. F. Shepherd, chief metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J., has devised a method for determining the hardenability of shallow and medium hardening steels, using a wedge-shaped specimen, fig 1. The test, now in use by several companies[1], is not only extremely accurate and reproducible, but can be simply performed in the laboratory on a production basis. Its high degree of reproducibility has been confirmed by comparing results conducted by other laboratories[1]. This test not only has demonstrated the fact that various laboratories can closely check one another, but, since each laboratory ground deeper and deeper into a specimen to obtain cross-check values, the constant hardenability pattern of a test piece was emphasized. This is important in that if the test specimen should inadvertently be cut off-center, the results would be unaffected.

The specimen has a 90° chisel edge and is 1⅛ in. overall in length. Its preparation consists of two 45° cuts made along the longitudinal axis of a steel bar

[1] *Bethlehem Steel Co., Crucible Steel Co. of America, Carnegie-Illinois Steel Co., Atlas Steel Co., Ltd., and Pittsburgh Crucible Steel Co. of America, Midland, Pa.*

with a power hacksaw (i.e., cuts from a 90° angle at the apex), and then a cut at 90° to the longitudinal axis of the bar in order to remove the specimen. A slight buffing operation on a power sander concludes the operation, which in its entirety takes about 3½ min, and the test piece is ready for the quench.

The quenching fixture (top view) is illustrated in fig 2, and the fixture in operation is shown in fig 3. The middle slot (fig 2) is cut parallel to the longitudinal axis, while the other slots are at 15° to the axis to converge the flow of quenching fluid about 3 in. above the slots. A foot treadle is connected to a quick-acting valve for control of the liquid flow. Although 10 pct brine at 80° to 85°F is used as the quenching fluid at Ingersoll-Rand, experimental tests proved that brine and fresh water, both at 80°F will give interchangeable results.

When the specimen has cooled so that it can be removed with bare fingers, a slab is removed with a cutting wheel, or a pair of wheels as shown in fig 4. The slab, which has the appearance illustrated in fig. 1, is then ready for hardness testing. The figure clearly shows the uniformity in depth of hardened case and well illustrates the principle mentioned before, i.e., the greater case distance as measured along a diagonal. As stated before, cutting the slab off-center does not affect the results. The slab specimen is now ready for the hardness-depth survey, in which a series of hardness tests are taken in a straight line bisecting the wedge angle and at known distances from the apex. The observed hardnesses are plotted against the measured distances, resulting in a curve such as is shown in fig 5.

The conventional criterion of hardenability, i.e., hardness of a quenched structure containing 50 pct martensite, is utilized. In other words, the hardenability of a low hardenability carbon steel is its P-V value, which is the distance in inches from the apex of the angle to the point where the hardness is Rockwell "C"55, "N30"73, "A"78.5 or Vickers 598. At Ingersoll-Rand the RN30 superficial hardness tester is used because of its greater sensitivity to hardness changes. Hardness tests have been conducted which show that the RC test, for example, requires a greater space interval between indents than the RA or RN30,—this is undesirable in view of the steepness of the hardness gradient. As shown in fig 5, however, even though the surface and core hardnesses vary, as represented by RA and RN30, the P-V value with both RA and RN30 coincide at 0.200 in. In routine testing, only a few hardness impressions are necessary, taken in the vicinity of the transition zone, in order to obtain the hardenability P-V value.

Hardness testing is conducted with a rather ingenious fixture, fig 6, which is so connected with micrometer attachments, that highly accurate measurements can be made. Also, if desired, hardness traverses such as shown in fig 1 can readily be obtained, for checking purposes. The fixture is mounted on the anvil of the Rockwell tester, as shown in fig 7, and not only can locations along a straight line be noted with a micrometer, but vernier movements at right angles are possible, so that an area of 2½ x 2 in. can be surveyed. An interesting feature is the permanent attachment to the Rockwell machine of a 10 power magnifying glass, which is focused on the point of the indenter. By this means the point of the indenter can be readily located exactly over the apex of the test piece, as is illustrated in the insert of fig. 7. B. F. Shepherd, the designer of the fixture, has offered to furnish blueprints of the apparatus to any laboratory or plant interested in making its own fixture (requests to be made on company letterhead, of course). However, Mr. Shepherd believes that the fixture, called the "Shepherd Surveying Stage," can be ordered at a lower cost from the Valley Tool & Precision Corp., Easton, Pa.

At the present time the Jominy test is extensively

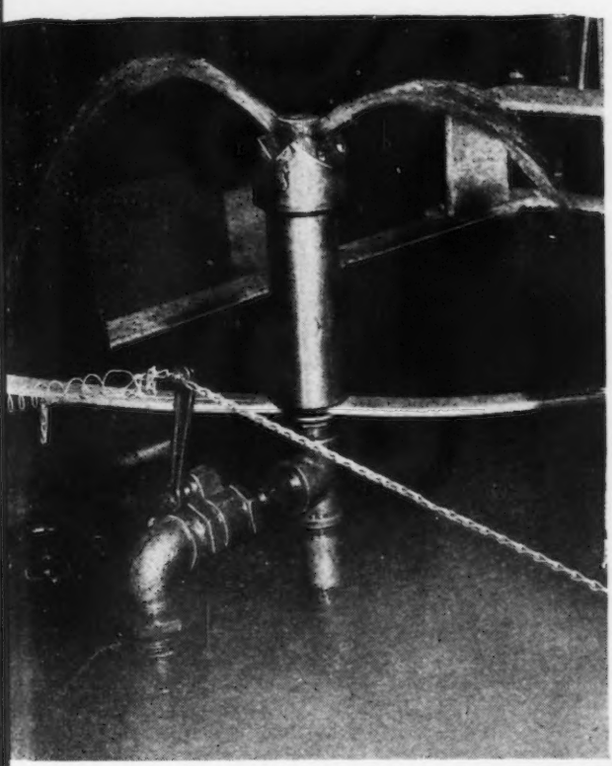

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FIG. 3—Quenching fixture in operation. Quick acting valve shown is connected to a foot treadle for ready control over flow of fluid.

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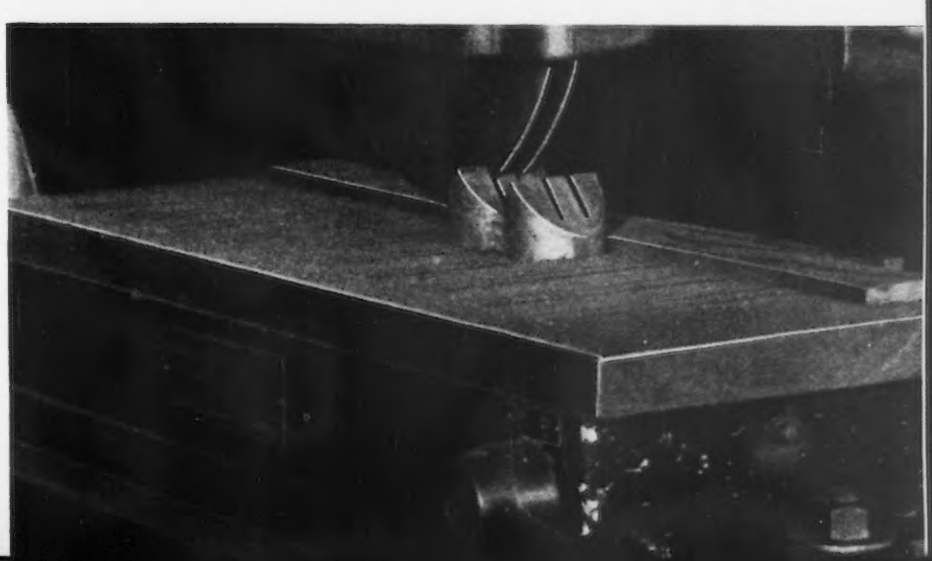
RIGHT

FIG. 4—Cutting slabs from P-V test specimens can be accomplished economically and rapidly with conventional grinding equipment.



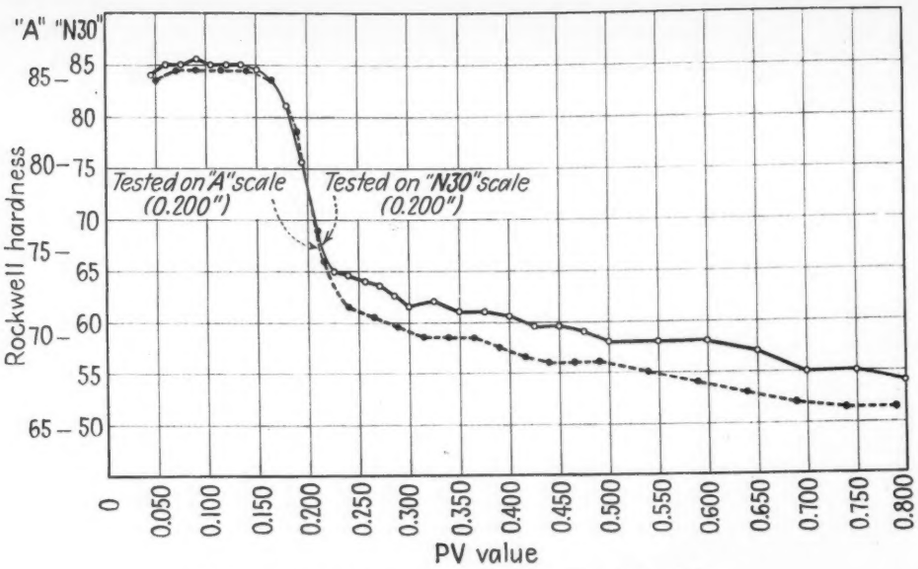


FIG. 5—A typical curve representing data obtained from P-V test.

rounds, and many others. The L type is not particularly desirable in view of the relatively high cost in carefully machining the test piece, plus the tendency of the bar to crack when quenched. The cone type, which also involves expensive machining operations, is unsatisfactory, due to the variations in quenching conditions inherent in the shape of the test piece.

The method whereby round bars of different diameters are quenched and fractured, etched or traversed with hardness measurements to determine the hardenability, has been rather extensively used in the past. An outstanding disadvantage, though not the only one, is that an

used for those alloys of deep hardenability, particularly for steels having critical cooling rates less than 100°F per sec. When faster rates are required, the Jominy test is not applicable. An example of this is shown by fig 8, which is the standard end-quench test conducted by the Bethlehem Steel Co., for the hardenability of a 0.40 C steel. Although the Jominy values compare favorably with P-V values, the steep slope of the Jominy curve renders it inapplicable for a shallow hardening steel.

Tests have been devised, from time to time, such as the "L" type bar, the cone type specimen, quenched

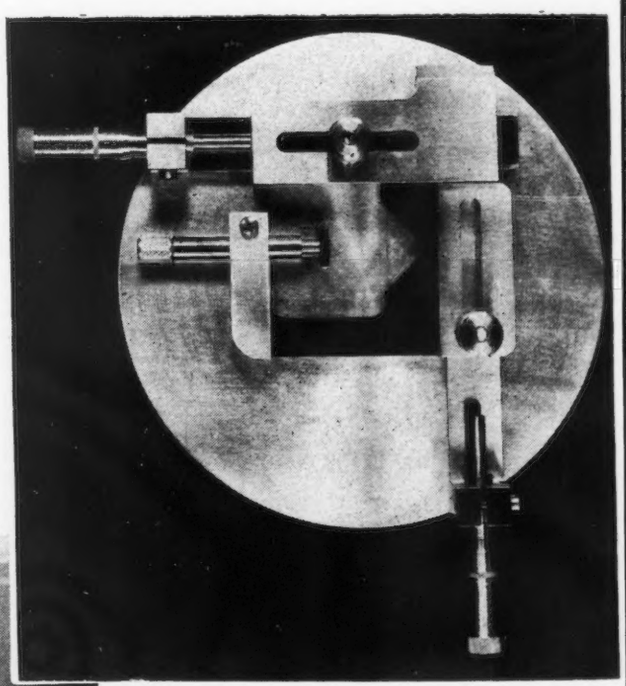


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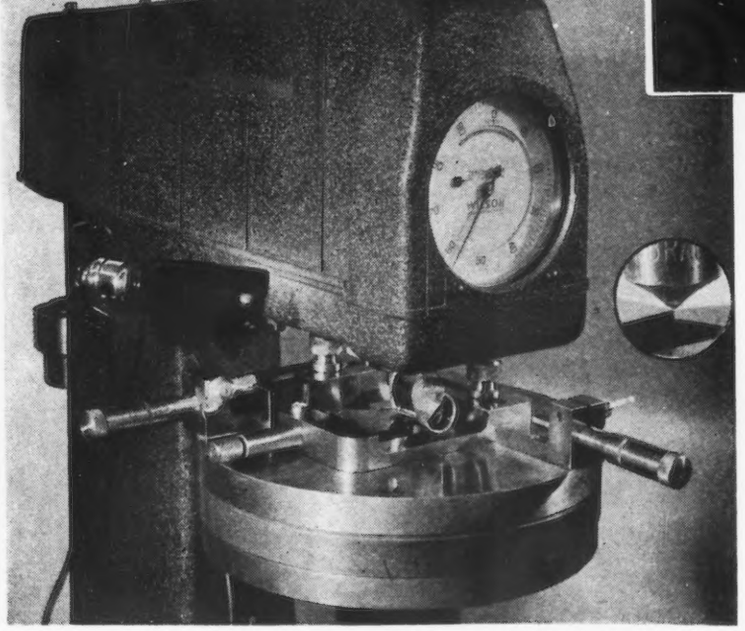
FIG. 6—The Shepherd Surveying Stage which makes possible micrometer precision dimensional control when making hardness tests.

BELOW

FIG. 7—Surveying Stage is shown mounted on anvil of Rockwell tester. Attachment of small magnifying glass to the Rockwell tester, makes possible the high precision as shown in the insert.



excessive number of round bars, machined to varied sizes, are always required. If the steel is relatively shallow hardening, the larger sized bars are useless, and if the steel is deep hardening, then the machining of the small size rounds is wasted.

In the P-V test, the specimen can be made directly from the bar, for bar sizes 1¼ to 1½ in. diam. For sizes larger than 1¾ in., it has been found desirable to machine down to 1½ in. round, to obtain reproducible results. Experimental tests conducted to determine the effect of diameter specimen, revealed the

deviations in results from 1¼ and 1¾ in. diam test pieces were no greater than variations noted when specimens were cut at different locations from one bar of steel.

The 90° wedge angle was found to be most suitable, since steeper angles increase the depth of penetration and increase the spread between individual tests.

In order to determine whether any inaccuracies resulted due to overheating during cutting and polishing, a series of hardened test pieces were subjected to tempering at various temperatures. Results showed that up to 400°F no measurable effect was noted.

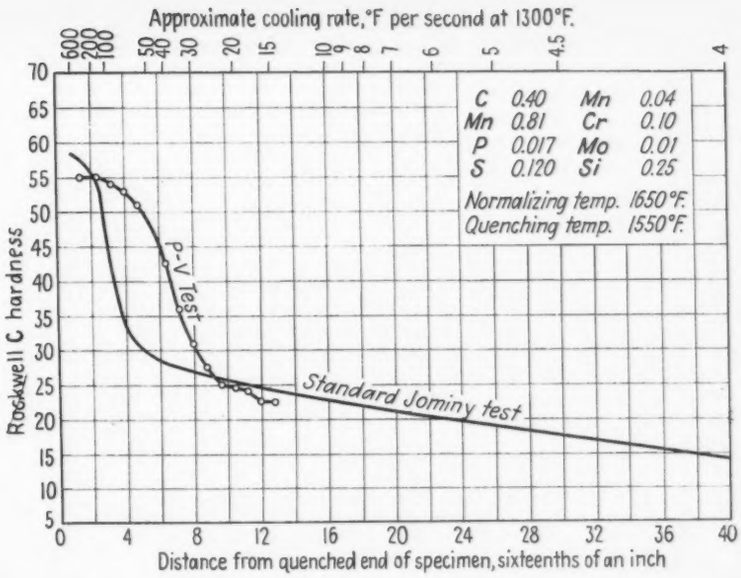
The acceptable heat treatment schedule which was decided upon for a 1 pct C steel, was as follows: (1) spheroidize specimen, (2) heat to 1450°F in electrically heated muffle—1 hr total furnace time, and (3) quench in 10 pct brine at 85°F. Several of the variables involved have already been touched upon. Others, such as (1) various conditions of austenitizing, (2) hardening temperature, (3) duration of quench, (4) time in furnace, and (5) transfer time from furnace to quench, were also considered by Shepherd. In view of the variation in effect of these factors, it is necessary that other austenitizing conditions and prehardening structures be standardized for other steels in order to give accurate and reproducible results.

The P-V technique has already been usefully applied by Shepherd in the determination of cooling rates of various steels. A typical sample of this work is shown in fig. 9, wherein the cooling rate curve for SAE 1040 steel at 1300°F, is plotted, comparing P-V test values with previous work[2]. The dotted line curve in the figure represents the work by Boegehold and Weinman[2], and the values plotted along the curve emphasize

[2] *OSRD Report 3743 by Boegehold and Weinman shows SAE cooling rates for Jominy bar to be in error for end of bar.*

the close check obtained by Shepherd (with thermocouples located as in OSRD research). The test procedure was refined by Shepherd whereby a longitudinal hole was drilled into P-V test bar, fig. 10. The depth of the hole was such that the thermocouple junction was at progressively further distances from the chisel edge of the test piece. The test pieces were later sectioned and measured with the micrometer microscope to determine the actual distance from end of hole to apex. These experiments showed the cooling rate curve to be even higher than obtained by Boegehold and Weinman, see fig. 9. In other words, a revision to present quenching practice may be desirable in many cases based on this new data.

In view of the enthusiasm already expressed by several leading metallurgists it appears that the P-V test is destined to become a popular method for classifying hardenability of shallow and medium hardening steels. The desirable features embraced in this method, whereby no expensive, close-tolerance, machining operations are required, excellent accuracy and reproducibility are achieved, and wide latitude of application is enjoyed, appear to justify the acceptance of this method as a standardized test.



ABOVE

FIG. 8 — A comparison between P-V test and standard Jominy test values for a 0.40 C steel

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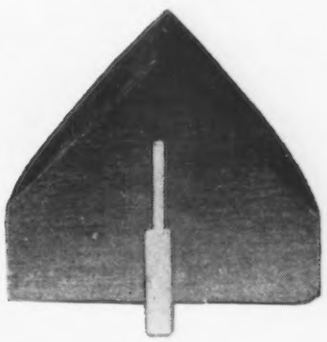
RIGHT

FIG. 10 — Thermocouple arrangement for obtaining cooling rate data showing hole drilled into P-V test specimen.



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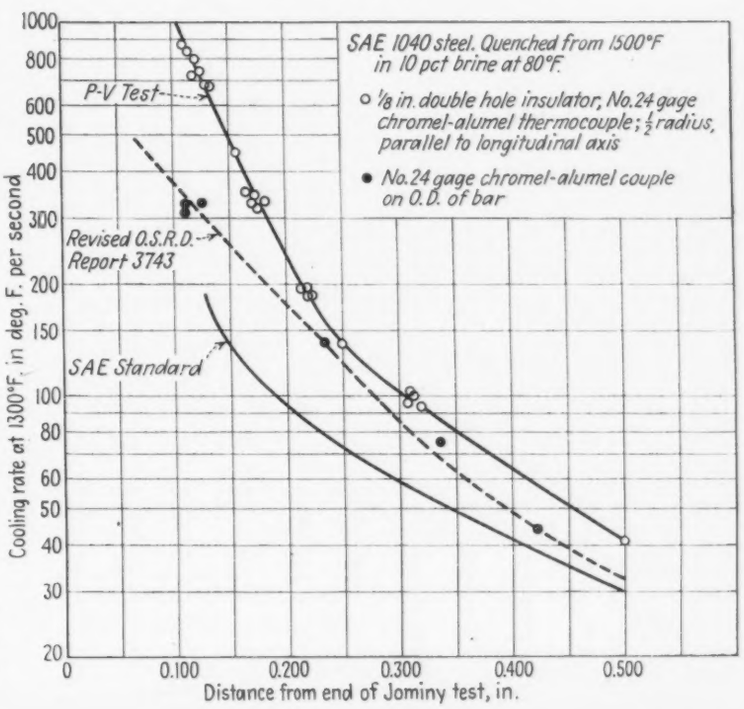
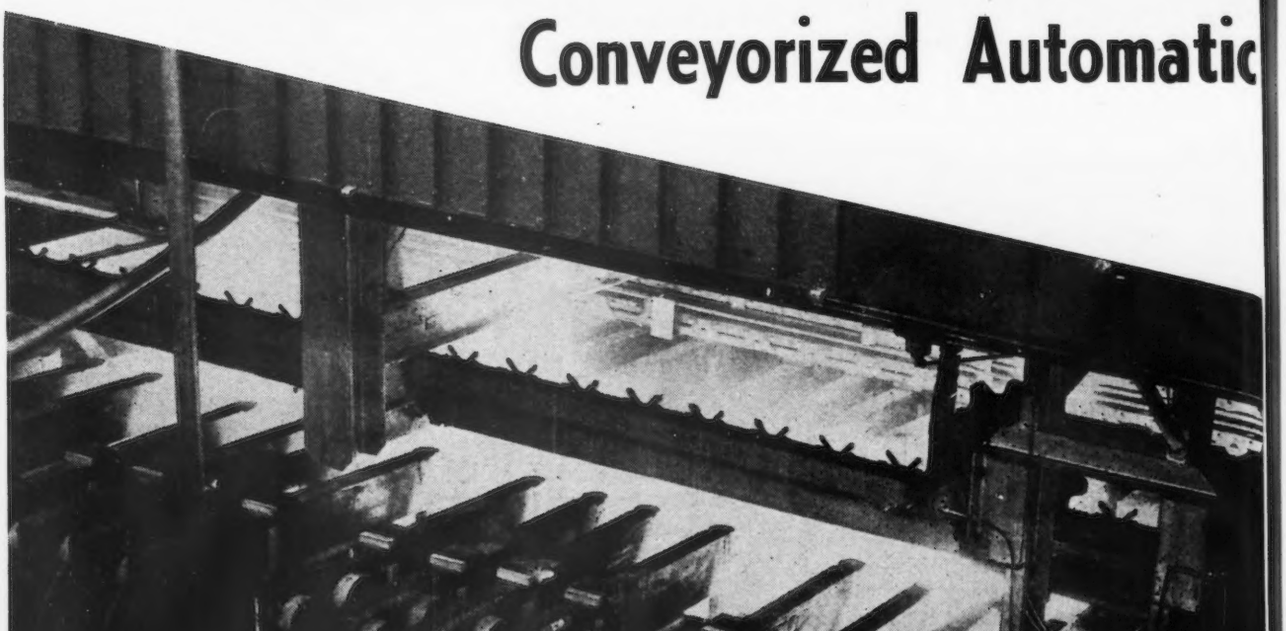
BELOW

FIG. 9—Cooling rate curves for SAE 1040 steel, at 1300°F, showing comparison between P-V test data and previous experimental data.



Conveyorized Automatic H



Automatic salt bath heat treating with the jack rabbit type of conveyor.

IN recent years automatic conveyor equipment for salt bath heat treating has been developed and designed to heat treat from 300 to 5000 lb of work per hour, per line. Advantages such as low labor costs, uniformity in product due to the positive timing of the conveyor mechanism, and the desirable working conditions, are a few of the economic factors that have contributed to the popularity of this method of heat treatment.

Depending on production requirements, only one or two men are usually required. The time cycle of operation on production determines the manpower needed with a given automatic unit. Inasmuch as the entire process is automatic from start to finish including heating, quenching, washing, tempering and final washing, a uniform standard practice is possible. This simplifies the problem of establishing metallurgical standards, since the timing is selected by the metallurgical department to produce the ultimate in quality.

Discussions of various details of salt bath use are contained in "Heat Treatment of Stainless Steel," May 30, 1946, p. 46 and "Characteristics and Uses of Salt Baths," Feb. 14, 1946, p. 46, THE IRON AGE.—*Ed.*

A number of various types of conveyors have been developed, as rotary conveyors, trolley conveyors, single arm conveyors, screw conveyors and a "jack rabbit" type which is applicable to many types of production.

Fig. 1 illustrates a conveyor mechanism typical of a unit which can be adapted to high temperature baths where the work is not of excessive weight but where the quantity of pieces to be treated per hour is relatively large. This particular unit was supplied through lend lease to the Russian government and was designed for the automatic conveying of high-speed drills through a series of salt baths to accomplish the hardening and quenching operations. The following heat treating cycle was set up for this particular application:

Loading station	**— 3 min**
First preheat	**— 1350°F**
Second preheat	**— 1550°F**
High heat	**— 2300° to 2320°F**
First quench	**— 1350°F**
Second quench	**— 1100°F**
Automatic unloading station	

This conveyor is somewhat unique in that the transferring operation was accomplished through three definite movements of the conveyor. The conveyor proper consisted of two units, a main frame and an inner conveyor which was so designed that the inner coveyor was raised, lifting the work out of the various salt pots simultaneously, indexed forward one station and lowered the work into the subsequent pot. At the unloading station the work was automatically released from the conveyor and traveled down into a cooling chute where it was available for the next operation.

This type of conveyor is inexpensive to manufacture because of the simplicity of lifting and forward movement. Therefore, in general, it can be considered to compare with a rotary type of mechanism and is more limited in its scope of individual handling, as compared to the "jack rabbit" type where greater selection can be obtained. Fig. 2 shows a general view of

Heat Treatment . . .

By A. F. HOLDEN
President, A. F. Holden Co., New Haven, Conn.

The problem of obtaining uniformity in metallurgical properties in heat treatment operations is greatly minimized by the use of automatic salt bath conveyor equipment. The author describes several types of conveyor mechanisms, associated with particular operations where these types have proven highly successful. A detailed discussion of automatic conveying methods as applied to conventional heat treatment and to martempering is also presented.

the two motor drive units on this conveyor. The drive unit at the top of the conveyor regulated the vertical movement of the inner conveyor frame. The drive unit shown at the bottom controlled the horizontal movement of the work through the conveyor chain, which in turn supported the work carrier bars. All timing of the conveyor units was accomplished by adjustable shoes mounted on sprockets which contacted a series of limit switches shown at the upper left hand side of the conveyor.

The type of racks which were used to suspend the drills to be hardened in a vertical position are illustrated in fig. 3. The flute of the drill is used as a method of support. The fixture was designed to hold drills varying from ¼ to ½ in. diam. Large size drills can also be hardened in this type of conveying equipment with only a minor change in the construction of the drill holders. This type of fixture allows each drill to be uniformly vertically supported, resulting in minimum distortion. With such spacing, uniform heating is obtained. This process and conveyor have been in operation for more than 18 months and has been highly successful in providing uniformly heat-treated high-speed drills.

The "jack rabbit" type of conveyor illustrated in fig. 4, utilizing vertical lifting stations which return the carrier bars automatically to the loading position, was used very successfully during the war on rocket tubes as well as tank grouser parts. The rocket tubes, in general, were given a treatment consisting of preheating at 1350°F, and a high heat hardening bath at 1575°, and then, depending upon the type of steel selected and the wall thickness of the motor tube, quenched into either a molten bath varying in temperature from 500° to 600°F, or quenched into hot oil. Following the quenching operation the tubes were tempered in a molten bath at temperatures varying from 700° to 1000°F, depending upon the hardness desired. In each case, whether quenched in a hot molten salt for the isothermal heat treatment, or whether quenched into hot oil, the pieces were suspended vertically and heated uniformly over the entire area. The work in these operations was suspended from a fixture which in turn was welded to a work carrier bar. The work carrier bars, which moved the work through the various hardening operations, were supported on either side of the furnace by lugs

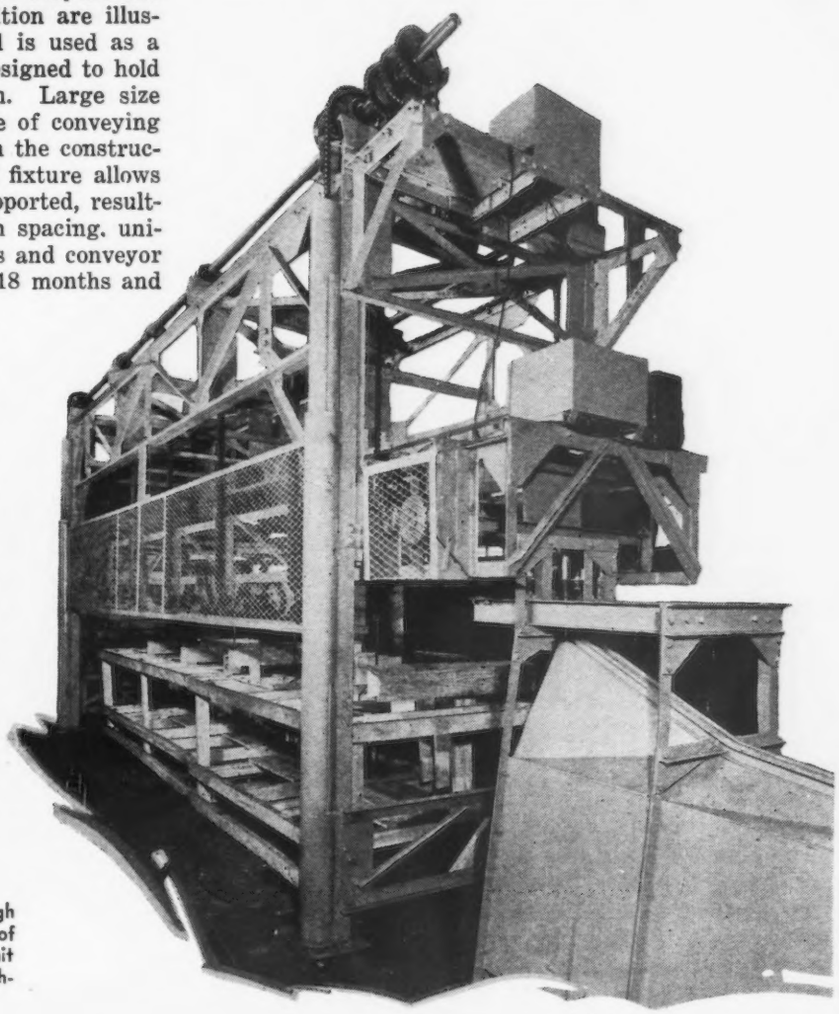


FIG. 1—A conveyor mechanism suitable for high temperature baths where a large quantity of light-weight pieces per hour is desired. This unit was supplied to Russia for heat treatment of high-speed drills.

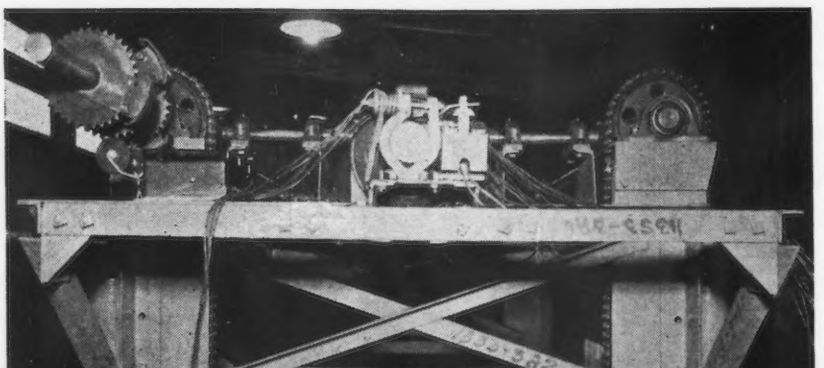


FIG. 2—A general view of the two motor drive units on the conveyor shown in fig. 1.

which were integral parts of two chains moving synchronously lengthwise along each side of the heat treating equipment.

This type of conveying mechanism has many advantages in heavy production in that the work may be hardened free from scale and with minimum distortion. As an illustration, rocket motor tubes processed vertically on these conveyors were held to distortion tolerances of from 0.002 to 0.004 in. in the overall length of 24 in.

The furnaces used for heat treatment of rocket tubes were electrically heated by means of immersion electrodes. This resulted in considerable economy in power consumption due to the direct heating of the salts by the immersion electrode principle. The equipment for processing 2000 to 2500 lb of rocket bodies per hour was 75 ft long. The largest units built for automatic conveying were 100 ft long, with one man at the loading end and one at the unloading end. A production rate of 4500 lb of heat-treated steel parts per hour was continuously maintained with these 100 ft conveyorized salt bath heat treating units.

The general construction of all conveyors of this type utilizes essentially three units—the main drive or power unit, the horizontal conveyor, and the transfer conveyors. Power is transmitted from the main drive unit to the first horizontal unit and subsequent horizontal conveyors are driven by means of synchronized chain drives. The work is loaded on the first horizontal conveyor by means of the first transfer unit which is automatically synchronized with the horizontal conveyor and automatically places the work carrier bar on the horizontal conveyor at predetermined spacing. The work then travels through the salt bath supported by the carrier bar until such point as the carrier bar contacts a limit switch. The limit switch actuates a transfer mechanism which in turn removes the carrier bar from the first bath in a vertical direction and then transfers it horizontally, finally lowering it into the next salt bath. Depending upon the operation, transfer units utilize either a constant drive or a variable speed drive mechanism. On quenching operations the variable speed drive is preferable, since the transfer or quenching time can be varied from 5 to 30 sec.

Simplified conveyor designs, providing the maximum in flexibility, are an important necessity to wider use of conveying equipment.

Figs. 6 and 7 illustrate conveying equipment arrangement for conventional oil or water quenching processes and for automatic martempering of production parts. In both illustrations a preheat furnace has been included to allow work to equalize out at below the austenitizing temperature. This has been found practical on many installations and adds only one conveyor lifting mechanism.

It is to be noted that this type of conveyor, contrary to the standard conveyors shown in the figures, is

FIG. 3—Drills to be heat treated shown in fixture which aids uniform heating.

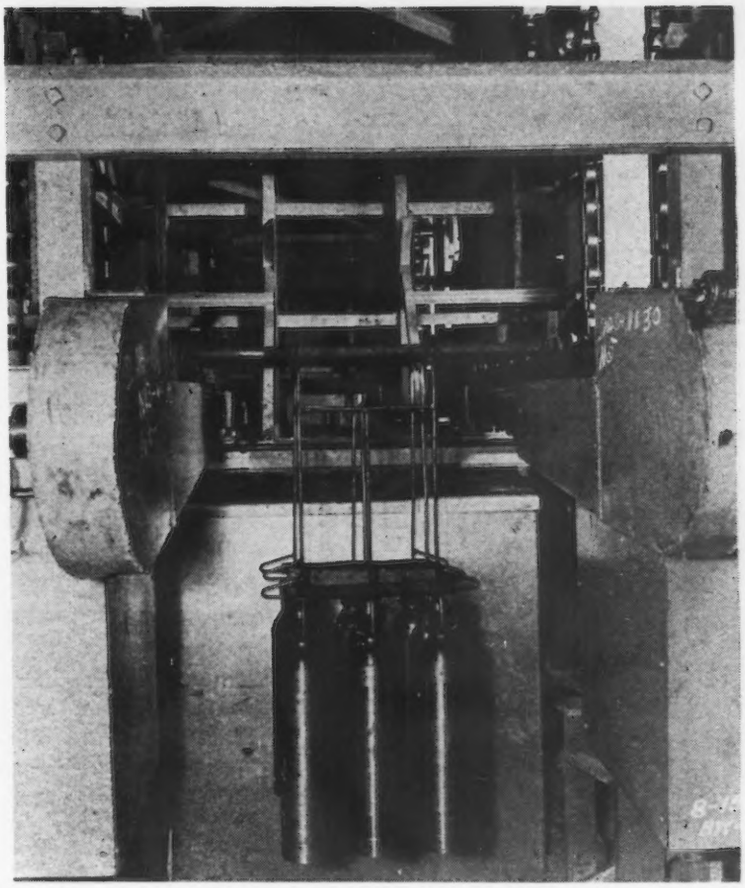
designed to be manufactured and erected as a packaged unit. Therefore, all units including A, B, C, D and F are completely erected, ready for installation. The larger units are usually erected at the conveyor site. The simplified type of conveying mechanism is designed to avoid plant erection, except for the assembling operation.

Fig. 7 schematically illustrates a conveyorized unit set up for a conventional heat treating process. The horizontal conveyor, unit G, and the loading transfer station, unit B, are driven and synchronized at the main drive unit A. A constant speed transfer, unit D, is located between the preheat and high heat furnaces. A variable speed transfer, unit C, is next utilized for quenching the work into oil. Since the transfer time at the subsequent operations is not critical, constant speed unit D transfer stations are used at these points.

The final transfer station, unit F, actually takes the place of two transfer stations and permits washing, draining and the use of a rust inhibitor at the final unloading end, all accomplished with but one transfer station.

These conveyors are adaptable to a wide range of work. For example, small parts which can be hung on fixtures can be treated in these same furnaces through the same cycles or shorter cycles simply by changing the work fixtures. Therefore, the conveyors and the furnaces to be used with them should be of sufficient capacity and depth to cover the entire range of application, permitting treatment of shafts or smaller parts in the same unit or process.

In conjunction with automatic martempering heat treatment, the quenching furnace plays an important part, particularly in quenching operations. Therefore a new type of martempering furnace has been developed. It is essential that the temperature of the salt



ABOVE

FIG. 4—Jack rabbit type of conveyor which was used very successfully during the war for heat treating rocket tubes.

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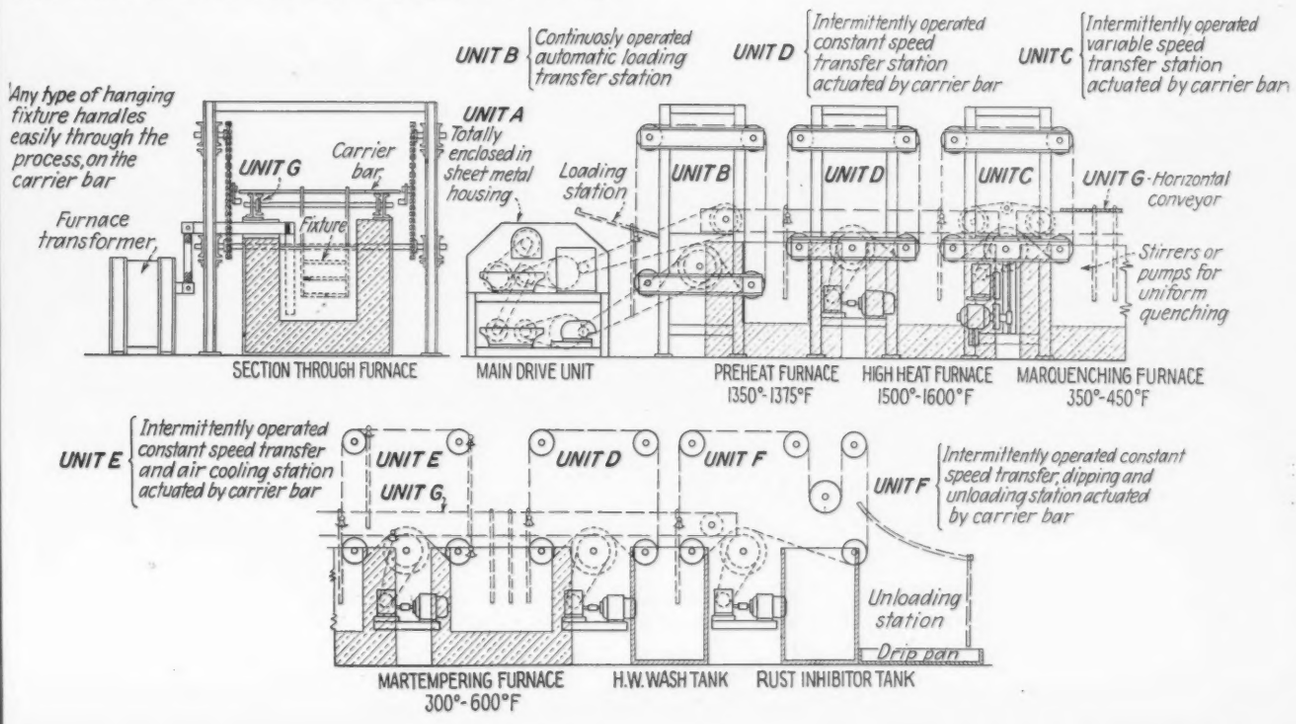
BELOW

FIG. 5—Schematic sketch illustrating conveying equipment for automatic martempering of production parts.


UNIT B
Continuously operated automatic loading transfer station
UNIT D
Intermittently operated constant speed transfer station actuated by carrier bar
UNIT C
Intermittently operated variable speed transfer station actuated by carrier bar
Any type of hanging fixture handles easily through the process, on the carrier bar
UNIT G
Carrier bar
Fixture
Furnace transformer
UNIT A
Totally enclosed in sheet metal housing
Loading station
UNIT B
UNIT D
UNIT C
UNIT G - Horizontal conveyor
Stirrers or pumps for uniform quenching
SECTION THROUGH FURNACE
MAIN DRIVE UNIT
PREHEAT FURNACE 1350°-1375°F
HIGH HEAT FURNACE 1500°-1600°F
MARQUENCHING FURNACE 350°-450°F
UNIT E
Intermittently operated constant speed transfer and air cooling station actuated by carrier bar
UNIT E
UNIT G
UNIT D
UNIT F
UNIT F
Intermittently operated constant speed transfer, dipping and unloading station actuated by carrier bar
Unloading station
Drip pan
MARTEMPERING FURNACE 300°-600°F
H.W. WASH TANK
RUST INHIBITOR TANK

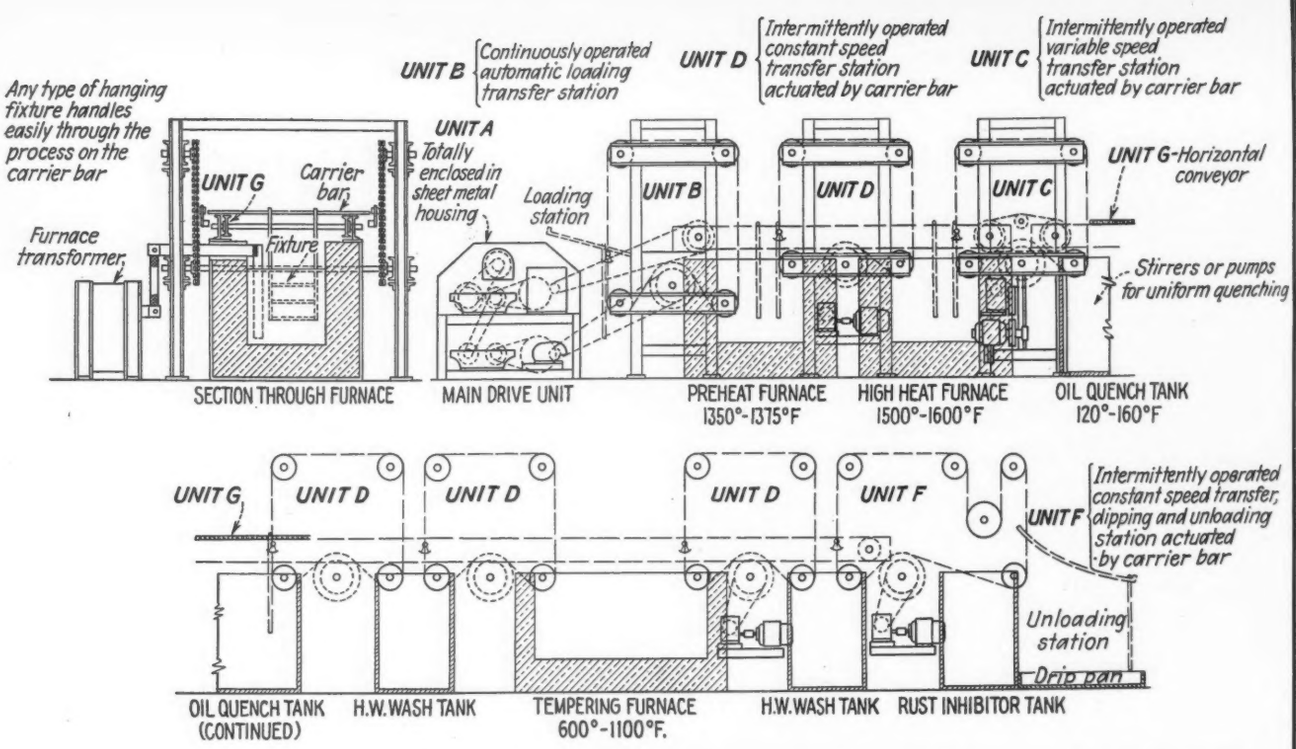

UNIT B Continuously operated automatic loading transfer station
UNIT D Intermittently operated constant speed transfer station actuated by carrier bar
UNIT C Intermittently operated variable speed transfer station actuated by carrier bar
Any type of hanging fixture handles easily through the process on the carrier bar
UNIT A Totally enclosed in sheet metal housing
UNIT G
Carrier bar
Fixture
Furnace transformer
Loading station
UNIT B
UNIT D
UNIT C
UNIT G-Horizontal conveyor
Stirrers or pumps for uniform quenching
SECTION THROUGH FURNACE
MAIN DRIVE UNIT
PREHEAT FURNACE 1350°-1375°F
HIGH HEAT FURNACE 1500°-1600°F
OIL QUENCH TANK 120°-160°F
UNIT G
UNIT D
UNIT D
UNIT D
UNIT F
UNIT F
Intermittently operated constant speed transfer, dipping and unloading station actuated by carrier bar
Unloading station
Drip pan
OIL QUENCH TANK (CONTINUED)
H.W. WASH TANK
TEMPERING FURNACE 600°-1100°F.
H.W. WASH TANK
RUST INHIBITOR TANK

FIG. 6—Schematic sketch illustrating conveying equipment for automatic conventional heat treating processes of production parts.

bath in the quenching furnace be maintained at constant temperature, irrespective of the amount of hot work quenched into this bath. Generally, provision is made to take care of this condition by using stirrers, pump or cooling chambers.

In the new furnace a pump is located in the quenching furnace so as to create an upward flow of salt in the bath. This hot salt in the upper part of the bath is constantly replaced by cooler salts from the bottom of the furnace and in turn the hot salt is cooled by aeration and circulation so that uniform quenching, which is an important part of any continuous process, is made possible.

The choice of conveyor unit and size of furnace, and whether a hot quenching bath will be used as compared to conventional oil methods, is important to consider and is dependent upon whether or not the steel will pass by the nose of the S-curve rapidly enough to reach the maximum hardness desired.

If the range of work is such that oil should be the method used for quenching, consideration should be given to the use of an oil heated to temperatures from 200° to 400°F, and adequate stirring equipment should be used to prevent localized overheating of the oil at this temperature—at the same time maintaining the work within minimum distortion limits the same as those obtained in hot quenching in salt baths.

In the rocket heat-treating application, one type was quenched in hot salt because of uniformity of wall sections, whereas on the other type hot oil was used at 200°F because of variances in wall thickness. In both cases, however, the distortion limits were essentially the same—0.002 to 0.004 in. overall length in 24 in.—primarily because a hot liquid was being used at controlled temperatures with vertical suspension.

Heat Resistant Plastic Insulator

UNHARMED by temperatures up to 575°F, and capable of withstanding the action of every known solvent, a new Dupont plastic material known as Teflon has recently been introduced. Produced from tetrafluoroethlyene resin, the material is said to surpass polystyrene and polythene in electrical properties. It possesses an extremely low dielectric loss factor, even at frequencies up to 3000 megacycles, and is thus an excellent insulating material for the ultra high frequencies required by radar and television. It does not dissipate the electrical power as do most organic insulators when subjected to high frequency currents.

Films of Teflon may be flexed without cracking at temperatures as low as −100°F, and its water absorption rate is zero. Already in use for a wide variety of electrical insulators and related parts, it is now being tested in the form of thin tapes for primary insulation and as material for slot liners. It is also being used for gasket material where resistance to heat corrosion is required, and for diaphragms for pumps and valves and as a valve packing material.

Properties of Various Alloys at Sub-Zero Temperatures

AN investigation to determine the mechanical properties of various ferrous and nonferrous alloys at —320°F, conducted by the engineering research laboratory of North American Aviation, Inc., Inglewood, Calif., indicated that both tensile and yield strength of all alloys tested are greater at the sub-zero temperature than at room temperature. Table I summarizes the results of the investigation with various alloys, while table II gives a comparison of mechancial properties of seam and arcwelded joints of the various alloys at room temperature and at —320°F.

The materials studied in this investigation were:

(1) Type 347 annealed stainless sheet, 0.026 in. gage.

(2) Type 302½ hard stainless sheet, 0.026 in. gage.

(3) SAE 1010 sheet, 0.048 in. gage.

(4) 75S-T Alclad sheet, 0.032 in. gage.

(5) Magnesium JS-1h sheet, 0.048 in. gage.

(6) 52S-O sheet, 0.064 in. gage.

(7) 24S-T Alclad sheet, 0.127 in. gage.

(8) Resistance seam welded samples of type 347 annealed, type 302½ hard, SAE 1010, Alclad 75S-T, and magnesium JS-1h.

(9) Arc butt welded samples of annealed type 347 stainless steel and SAE 1010.

The sheet metal specimens used in this investigation were sheared 12 x ⅞ in. with the long axis of the specimens perpendicular to the direction of rolling. All of the specimens, except those of stainless steel and SAE 1010, were machined to the dimensions of standard tensile specimen type 5, specification QQ-M-151. The reduced sections of the stainless steel and SAE 1010 specimens were machined to a width of ¼ in. instead of the standard ½ in. to insure fracturing in the reduced section when tested at —320°F.

Welded specimens were 10 x 1⅓ in. with a reduced section extending 1 in. on either side of the weld. This reduced section was ⅞ in. wide for all specimens except those of stainless steel and SAE 1010 which were machined to a width of ½ in. for the reason mentioned previously. The edges of all the specimens were finished by draw filing and polishing with No. 320 grit emery cloth.

Tests were conducted on a 20,000-lb Riehle testing machine. A special container and set of specimen grips were constructed for use in this test. The specimens, grips, and container were precooled with dry ice for approximately 2 hr before testing. The specimens were then secured to the container and the container filled with high purity liquid nitrogen until the reduced section of the specimens was completely immersed. When the violent boiling of the liquid nitrogen subsided (this usually occurred within 3 to 4 min after immersing the specimen), the specimens were tested. A pentane thermometer and a chromel-constantan thermocouple were used to check the temperature of the liquid nitrogen after the violent boiling had subsided. Two specimens of each alloy and weld sample were tested at —320°F. Samples of each alloy and weld specimen were tested at room temperature for comparison purposes.

Summing up the results of the investigation, it was reported that both the tensile yield and tensile ultimate strength of all alloys tested were greater at —320°F than at room temperature. The percentage elongation of all alloys except 52S was lower at —320°F than at room temperature. However, the stainless steel and aluminum alloys still retained sufficient ductility at —320°F to permit their use for general structural application. The ductility of SAE 1010 and magnesium alloy JS-lh, however, was reduced to such low values as to render them unsuitable for use where ductility is required. In general, the joint efficiency of resistance seam and arc butt welded joints of all the alloys tested was lower at —320°F than at room temperature.

TABLE I

Mechanical Properties of Various Alloys at —320°F and at Room Temperature

Material	At Room Temperature			At —320° F		
	Yield Strength, psi	Ultimate Strength, psi	Elongation** pct in 2 in.	Yield Strength, psi	Ultimate Strength, psi	Elongation** pct in 2 in.
Type 347, Annealed	38,000*	95,700*	72.0	82,700	232,300	49.5
Type 302, ½ hard	129,100*	169,100*	25.5*	140,400	275,400	20.5
SAE 1010	28,800*	41,500*	40.5*	119,000	119,000	0.0
Alclad 75S-T	67,100*	78,100*	11.0*	79,800	91,900	6.0
Magnesium JS-1h	37,200*	47,300*	6.5*	44,900	51,100	1.0
52S-O	14,100	29,100	19.5	16,600	42,300	23.5
Alclad 24S-T	47,000	68,700	20.0	59,400	85,000	14.5

* Results of one specimen. All other values are average of two specimens. ** Elongation measured at room temperature after testing at —320°F.

TABLE II

Mechanical Properties of Seam and Arcwelded Joints at Room Temperature and at —320°F

Material	Type of Weld	At Room Temperature		At —320° F	
		Ultimate Strength, psi	Joint Efficiency*	Ultimate Strength, psi	Joint Efficiency*
Type 347, annealed	Seam	92,700	97.0	233,000	100.0
Type 302, ½ hard	Seam	148,900	88.0	174,800	63.5
SAE 1010	Seam	42,700	100.0	31,500**	26.4
Alclad 75S-T	Seam	37,900**	48.5	29,700**	32.4
Magnesium JS-1h	Seam	25,900	54.7	23,500**	46.0
Type 347, annealed	Fusion	53,500	97.6	190,000**	82.0
SAE 1010	Fusion	42,900	100.0	103,200**	87.0

* Joint efficiency = Ratio in per cent of weld ultimate strength to parent metal ultimate at test temperature. ** Fractured in weld; all others fractured outside weld.

Tantung—

What it is . . .

How to use it . . .

FIG. 1 — Drills, end mills, spiral blades for slab mills, wire guides made of Tantung by casting in investment molds.

o o o

By D. I. BROWN
Chicago Regional Editor

o o o

THE need of the metal cutting industry for a material to supplement the older cutting tools has in the past been more than partially responsible for the rapid expansion of the "Tinkers" original vocabulary. This need has been fulfilled by a new alloy containing tantalum carbide which made its debut just prior to the war. This nonferrous alloy, called Tantung, developed by the Fansteel Metallurgical Corp., North Chicago, Ill., is not a steel or a cemented carbide. It is further unique in that it is precision cast to shape. Although some of the shapes made by this process are employed as cast, other forms are superficially ground prior to use so that a better overall terminology of this particular method of manufacture might be form casting. The tungsten-chromium-cobalt type alloys came into use shortly before World War I and have achieved a permanent useful position in the cutting tool field. With so much specialized research and highly technical study having been done in the field of cutting tools, it has been a relief to find a material for cutting steel that doesn't have to be heated, quenched or frozen, but just cast and used as is. Tantung is also very resistant to corrosion and abrasion which opens new fields to alloy application.

The best of the regular materials available to the tool engineer in the past have been of three types, high speed steels, cast alloys and cemented carbide. These materials have proved themselves suitable over a wide range of machining conditions. However, these metals have not been able to fulfill all the demands of the tool engineer and Tantung has stepped into the gaps where the other materials have been found wanting. High speed machining involving conditions of interrupted cuts, chatter and shock are being easily executed today with cast Tantung. The use of Tantung tools overlap the older types in some cases; and in many instances their performance does not equal that of high speed or cemented carbide. Each operation done with Tantung has been judiciously studied and a casting technique is used which endows the tools with the proper metallurgical characteristics for the particular type of work.

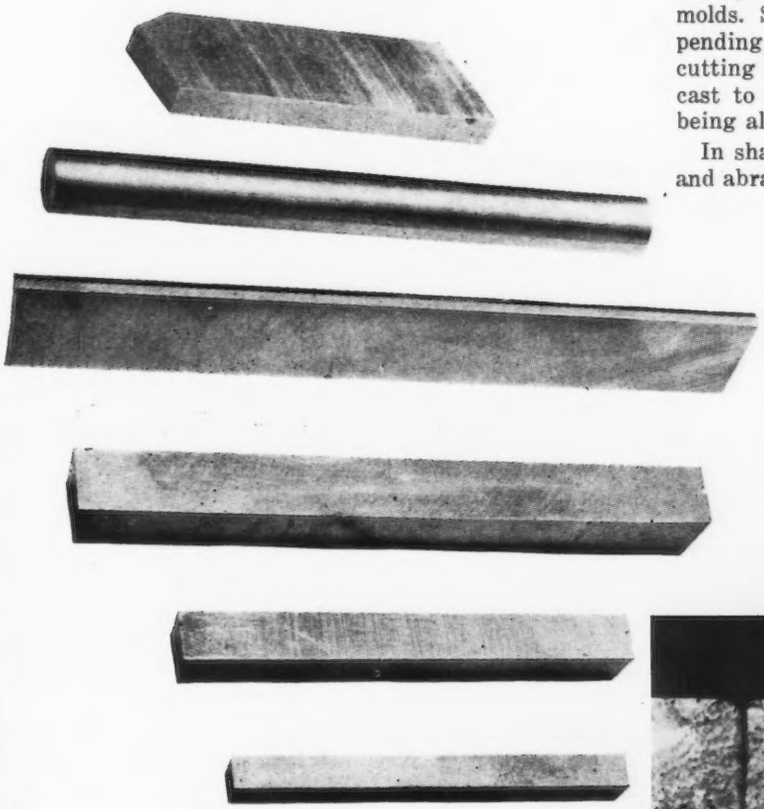
Generally, Tantung tools can be used with the same rakes, clearances, angles and chip breakers as are used with high speed steel, although it is good practice to support the cutting edges as much as possible. The new metal can be used with positive rake. Maximum cutting results are obtained by setting the nose of the tool at, or slightly above, the center line. For roughing cuts a large nose radius is better than the small nose radius usually recommended for cemented carbide. Tantung is not recommended as a substitute for cemented carbide tools. It should be specified, and is being used, where other cutting materials cannot be employed effectively. Machines which are ordinarily not capable of high operating speeds and are subject to vibration because of worn parts, can be made efficiently productive through the use of the new alloy. In cases of turning a piece of work on which there are two diameters, both being cut simultaneously, the difference in peripheral speeds requires two types of tools. Often when using cemented carbide on the large diameter, the speed of the second cut is too fast for high speed steel, so that Tantung fits in nicely.

The basic metallurgical properties of the alloy are

One of the newer additions to the tool engineer's store of specialized cutting materials, Tantung bears many promising facets if full advantage is taken of its specific characteristics. This interesting cast alloy is explored in detail herein, discussing how it is produced, its metallurgical and physical properties and how to use it to advantage in machining operations. Data from a number of comparative machining tests are given for the first time and use of this alloy for parts where high resistance to corrosion and abrasion is required is also covered.

due to its complex analyses. Controlled form, or shape, is also engineered into the process. Tantung is first made metallurgically suitable to do a job, which at times limits the scope of its application. Sizes ranging over 5 lb are not generally made. Further adjustment of the physical properties of the metal are regulated by pouring temperature and the chill or cooling rate of the casting. Hardnesses produced by casting into permanent molds range from 61 Rc to 63 Rc. Investment molding of the same analyses give hardnesses of the order of 55 Rc to 59 Rc. The size or volume of the casting obviously controls the rate of cooling so that the general rule of thumb in hardness of the two methods may not always hold true. Higher hardnesses are also influenced by the amount of carbide retained in solid solution from the casting temperature. A fast cooling rate for the casting further imparts a finer grain structure to the surface and improves the transverse rupture strength. Most of the cutting tools fall in this category, that of requiring high hardness and strength, and hence are usually cast in permanent molds. Such molds. are made of metal or graphite, depending on the tool. Fig. 2 shows some of the typical cutting tools cast by this method. Such shapes are cast to permit cleanup with a minimum of 0.01 in. being allowed for such removal.

In shapes where hardness is secondary to corrosion and abrasion properties, the cooling rate of the casting is not usually of paramount importance. Such shapes of more intricate design are cast in investment molds which are made by the lost wax process. Fig. 1 depicts some of the less intricate shapes made by this method. These castings are often used without any further preparation from the mold to the point of application.



ABOVE

FIG. 2—Square and rectangular tool bits, cutoff blades, solid rounds and milling cutter blades are typical Tantung products cast in permanent molds.

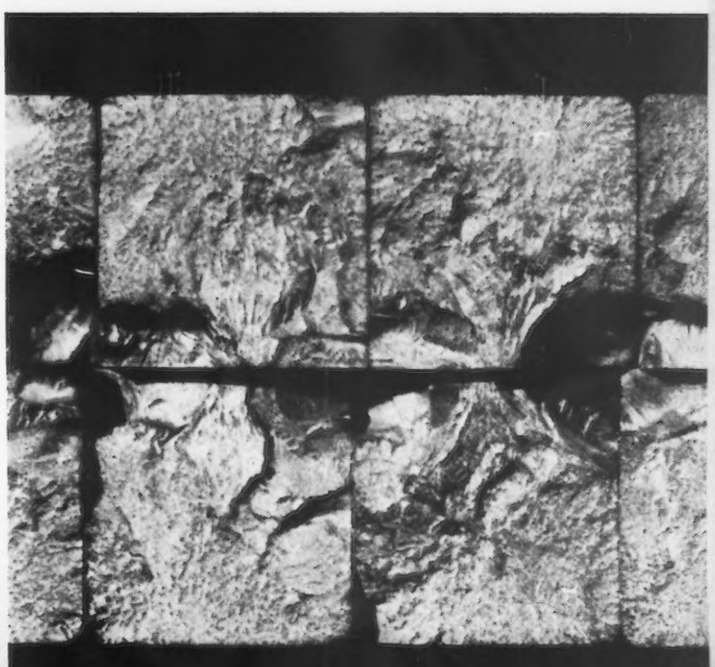
o o o

RIGHT

FIG. 3—Typical fractures of ⅜ in. sq Tantung G-test tool bits. X 3.5.

Production of Tantung

Tantung is melted in an electric arc furnace, using both virgin materials and croppings, with a tapping weight of about 80



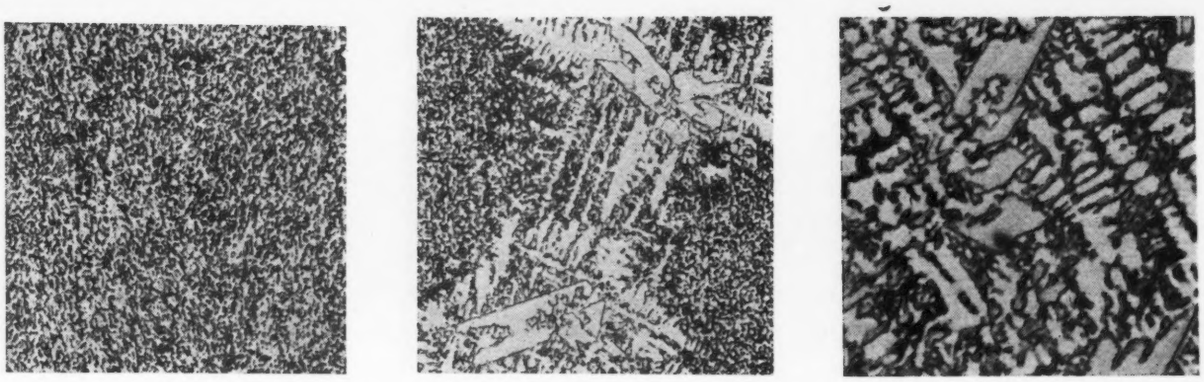


FIG. 4—Typical structures of Tantung G tool bits. Micro at left shows case structure at 300 diam.; center micro is from the center of the casting and shows typical carbide segregation (X500). Carbide segregate at greater magnification (X1000) is illustrated at right.

lb. The melting process which combines melting, solution and conversion by chemical reaction is complex and is carried out according to schedules established by the control laboratory. The higher melting materials, such as tungsten, are added to a molten bath when sufficient temperature is reached for proper solution. Pouring temperatures are approximately 2500°F and the metal is very fluid at that temperature. Tantung has a rather narrow liquid range with a tendency to solidify rapidly. Centrifugal casting is used whenever it is found that gravity feed will not properly fill out the mold. This method of casting is used both with the permanent and investment type molds.

Each casting or cluster of small castings is actually an ingot. The metal has a high degree of shrinkage and subsequently produces considerable pipe. Shrinkage cavities, or pipe, are confined to the top third of the ingot or feeder as the case may be. Care is taken to crop off the pipe area. The discarded metal is used as scrap for recharging. As Tantung cannot be readily machined, the ingots are cropped with rubber or resinoid bonded abrasive wheels. The material is cut dry, using 46 to 50 grain wheels. Cut-off wheel speeds are 10,000 to 12,000 fpm.

Properties of Tantung

As Tantung is the trade name of a series of complex alloys, only the composition of the commonest, Tantung G, is shown for illustrative purpose. The composition range of the G alloy is as follows:

Element	Range, pct
Cobalt	45 to 50
Chromium	27 to 32
Tungsten	14 to 19
Tantalum and Columbium	2 to 7
Carbon	2 to 4
Iron	2 to 5
Manganese	1 to 3

The alloy is non-magnetic over all operating temperatures. It cannot be rolled or forged. The coefficient of expansion is 7.5 x 10^{-6} per 1°F over 100° to 1200°F range.

This alloy has very high transverse rupture strength. The tensile strength of investment cast material is in the range of 60,000 to 65,000 psi. The metals cast in permanent molds are much stronger. Tantung has not been found to have any appreciable elongation. The transverse rupture strength of Tantung standard tool bits, cast in permanent molds, ranges from 300,000 to 340,000 psi. These values correspond roughly to breaking strength of 7000 to 8000 lb for ⅜-in. sq tool bit. As a step in production control, specimens from each lot of metal are finished ground and then broken to determine the strength required to break them. Standard ⅜-in. specimens suspended on 1½-in. centers are broken on a universal Olson testing machine by applying a

FIG. 5—Test setup for an end mill cut in Navy brass. A tantalum carbide mill gave 26,250 pieces per grind.

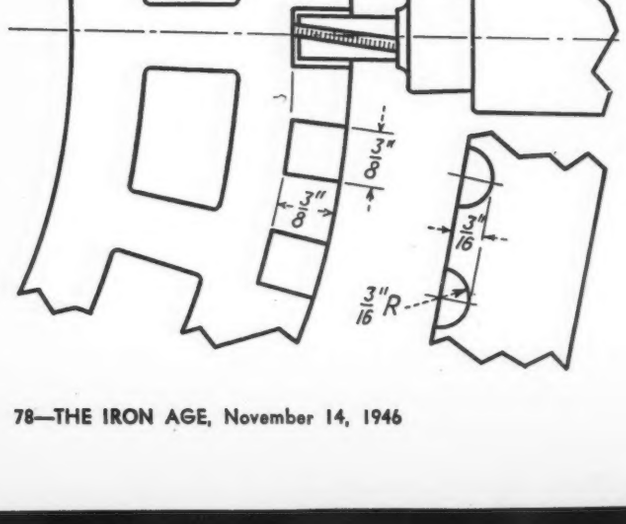
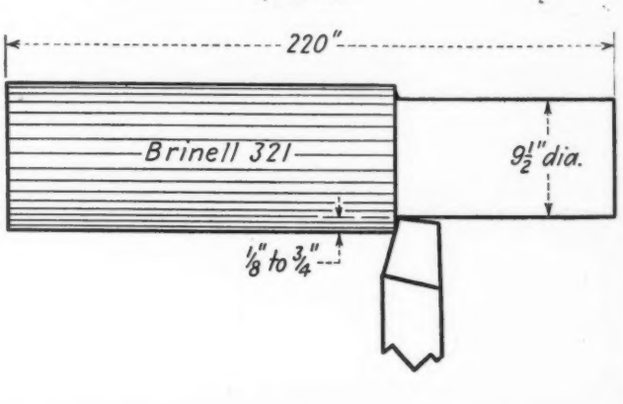


FIG. 6—Test setup covering a turning operation on scaled Ni-Cr bar stock in which a Tantung cutter gave a life of 85 in. cut between grinds, as compared with 23 in. with high speed steel.



load at a point midway between the points of suspension. After breaking the tip tool the fractures are examined. Typical macrographs are shown in fig. 3.

The new metal is ground by conventional methods. The popular wheels for surface grinding are 7 x ½ in., 46 grain, soft bonded aluminum oxide, used dry. The same type of wheel in an 8 x ¾ in. size, 60 grain, is also used dry. The best choices for face grinding are 6 x 1 in., 6 x 1½ in., and 10 x 2 in., all 46 grain, which may be used dry or wet.

If grinding is done wet, a profuse flow of water is desirable directed at the point of grinding. Water pressure should be kept low.

Contrary to common opinion, the room temperature hardness of the cutting tool does not necessarily measure its ability to cut at high speed. Although high speed steels may be harder at room temperature, they do not retain hardness at operating temperatures as well as the cast alloys. Cast drills of Tantung have successfully demonstrated this feature by penetrating high speed steels. The heat generated in such a process softens high speed steel to the extent that it can be cut with Tantung. If the cast alloy is used in place of high speed steel, the surface feet per minute should be at least doubled, as chips build up on the cutting edge, as happens when carbide tools run at low speed. This is one reason the new alloy has a longer tool life than high speed steels, as in greater surface feet per minute the high heat generated is in the chips and not in the tool. Machinists, attempting to define the new alloy, have termed it slippery and it has been noted that the tool area under the chips tends to shine up rather than become dull and start to drag.

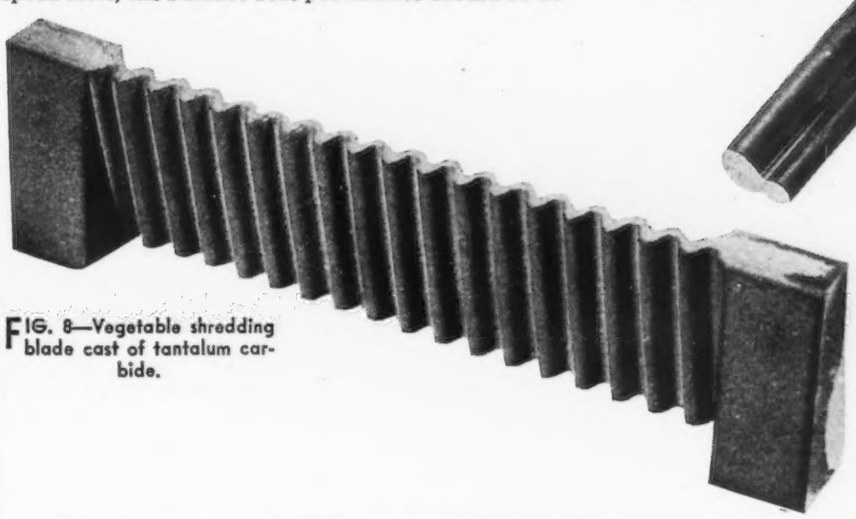


FIG. 8—Vegetable shredding blade cast of tantalum carbide.

Typical structures of a ⅜-in. Tantung G tool bit are shown in fig. 4. The micro represents at the left the case or outer area, the middle micro is from the center of the casting in which massive scattered carbides occur. The illustration at the right shows the carbide segregation at higher magnification. Both carbides and matrix are composed of highly complex alloys of the various constituents which, as yet, have not been studied.

The specimens in fig. 4 were prepared by rough grinding, using boron carbide on a metal lap, rough polishing on hardwood with a fine diamond powder suspended in oil, final polishing being done with very fine diamond dust in oil on a hardwood lap. Samples were etched with an alkaline ferri cyanide solution, followed with nital. Freshly concentrated sulphuric acid can be used instead of nital in the last etch.

Cutting Performance

The research department of a large machine tool builder has done considerable testing on the new alloy. Some of the results of these tests are given herewith: *Inserted tantung-tooth helical mill*—Using a 3 x 3½ in. helical slab mill with six brazed-in tantalum carbide tips on a No. 4 HP horizontal milling machine selected cutting speeds were run on a 2½-in. wide test block of SAE 1112 cold rolled steel, 12-in. long. A constant depth of cut of 0.2 in. was used with five different combinations of feed and speed, as follows:

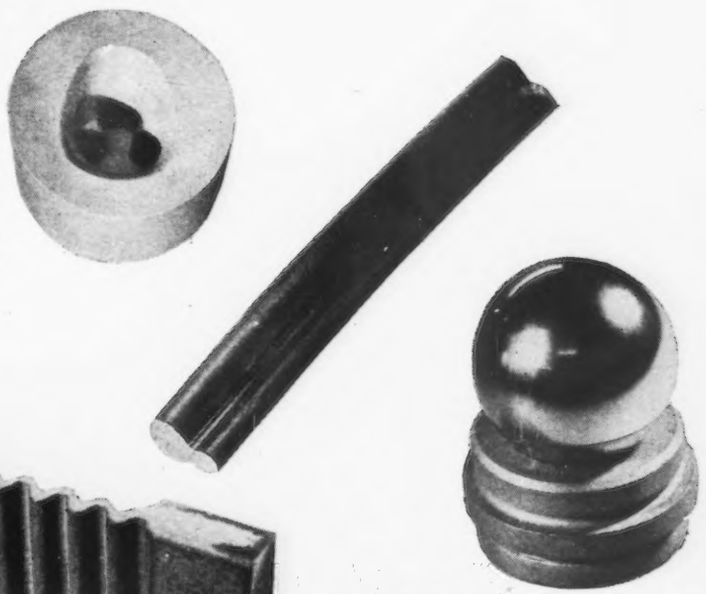


FIG. 7—Shape dies such as the one for drawing trolley wire (upper right) can often be made by casting from Tantung at lower cost than the three piece cemented carbide die nib previously used. Tantung balls and seats (lower right) for service in oil well pumps withstand salt water and sulfur corrosion, as well as mechanical erosion and wear from sand and rock particles.

o o o

Cut Number	RPM	Cutting Speed, sfpm	Feed Rate, rpm	Feed per Tooth
1	310	240	19	0.01
2	388	300	19	0.0085
3	480	370	19	0.0065
4	480	370	24	0.008
5	480	370	30	0.01

These cuts were taken without the use of a cutting fluid. No chatter was observed at any time and the finish was excellent. At the completion of the test the cutter showed very little sign of having been used although 30 cu in. of metal had been removed. Examination of the cutter showed not more than 0.001 in. wear on the flanks. The faces of the teeth had actually undergone an improvement in finish where there had been chip contact.

Cutter life test in steel—Without regrinding, the

cutter used in the previous test was then set up on a No. 3 horizontal dial type milling machine and a steel of lower machinability was chosen for the life test. A bar of NE 9445, presenting a total width of 2½ in. was machined. The hardness of the steel was 302 Bhn, and the same depth of cut was again used. With each speed, cutting was continued until one or more definite signs of failure were observed, such as change in finish, increase of heat in chips, increase of power, rapid increase in wear on flank or grooving of flanks.

After each test the cutter was reconditioned as near as possible to the original shape before changing to the next speed. The results were as follows:

Surface ft per min.	Feed per Tooth	Total Linear Inches Cut	Total Metal Removed cu in.	Cu. In. per Tooth per In.	Remarks
144	0.0089	52	26	1.74	Worst
210	0.0087	120	60	4.00	2nd Best
275	0.0094	130	65	4.33	Best

The life figures were not compared with similar data for high speed or cemented carbides. The tests indicate, however, that a fourfold increase in cutting speed is possible as compared with H.S. steel, thus permitting corresponding increases in feed rate and production.

Cutter life test in cast iron—Three speed and feed combinations were selected for cutting cast iron, and the same procedure was followed as in the previous test. Material to be cut was of standard 2 x 6 in. Meehanite C, 130 Bhn, in the rough state. Clearance on the cutter was increased from 0.0035 to about 0.0045 in. and the depth of cut was the same as before.

Surface ft per min.	Inches Feed per Tooth	Total Linear Inches of Work Cut per Grind	Total Metal Removal, cu in.	Cu. In. per Tooth, per In., per Grind	Remarks
118	0.0107	630	396	21.00	Good Life
177	0.0090	450	280	14.95	Grooves Developed
275	0.0094	420	262	14.00	Excellent Finish

From these tests it is evident that the lowest speed gave the best performance. The medium speed which seemingly might have resulted in a good compromise was affected adversely by the development of grooves which began to form suddenly, and if allowed to continue would probably become so deep as to require excessive stock removals in resharpening. Chips produced were unusually well formed and the finish was very uniform from beginning to end. At the highest speed the built-up edge and the finish was marred only by the revolution marks. At the intermediate and lower speeds the built-up edge was larger and the finish showed tearing but was so even that it merely produced a dull mat finish.

Tantung is reported to have out-cut cemented carbide tools on certain materials, such as brass, copper, and 18-8 stainless steel, however, the new alloy does not perform well on aluminum but oddly enough, cuts magnesium beter than either of the other types. The alloy is cast as full tools or inserts. Inserts are brazed on with silver solder similar to the practice used with cemented carbide tools.

Fig. 5 shows an end mill operation on Navy brass in a Kearney & Trecker milling machine. Fed by hand

	Tantung	High Speed
Pieces per grind	26,250	3,750
Surface ft per min.	260	140

operation, in production runs, Tantung was found to give many more pieces per grind.

One large forge company that makes their own tools out of Tantung solids, experienced faster production because of increased speeds and much longer tool life over that obtained using high speed steel. Fig. 6 depicts the simple turning operation on scaled Ni-Cr alloy bar stock. Turning was done on a 42-in. axle lathe using a feed of 1/16 in.

	Tantung	High Speed
Surface ft per min.	80	45
Cutting between grinds	85 in.	23 in.

Tantung cut-off tools applied to 18-8 stainless have shown over 154 pieces per grind compared to 3 pieces per grind for high speed steel. Speed was 110 sfpm, with a feed of 0.0045 in. on a No. 1A Warner Swasey turret lathe. In screw machine application Tantung has shown equally good performance. Operations of turning, forming, chamfer and cut-off on a tapping block machined from SAE 4130, on a Footburt Automatic screw machine, showed these results:

	Machining Time, Min.	Pieces per hr	Cost per 100 Pieces	Speed, sfm
High Speed steel	8.90	6.74	$14.82	230
Tantung	2.45	24.5	4.07	460

The use of high speed steel in tools or metal cutting entails many factors that can be dispensed with if Tantung were employed. Notable in this respect is the fact that Tantung requires no heat treatment. This characteristic eliminates many of the worries and tedious heat treating procedures required when using the high speed steels. The properties of Tantung are fixed by casting technique. It is impossible to temper the alloy short of its plastic range, and subsequently warpage, cracking, decarburization and the host of other possible difficulties can be forgotten. This is particularly helpful to a small shop that cannot afford all the needed facilities for treating high speed steels.

Minute porosity is encountered in most cemented carbides. Here again, manufacturing variables enter into the final reliability of the product. Tantung is not subject to all the manufacturing difficulties involved in cemented carbides, or the type of failure usually encountered on carbide tools. Tantung is a solid, not porous material and does not need the backing up usually required when using cemented carbide tools.

One very useful property of Tantung is its resistance to corrosion and abrasion. Many applications have been made in the food processing industry where stainless steel may resist corrosive media but will disintegrate under the abrasive action of solids. Another example of the new alloy's performance under extreme conditions is its use in ball and feed valves for oil well

pumps, such as is shown in fig. 7. These parts are subject to the corrosion of high sulphur and brinish liquor as well as the abrasive action of rock and sand. Combined properties in Tantung of hardness, resistance to corrosion, erosion, impact and chipping have greatly reduced costly replacements in this type of equipment. well as the abrasive action of rock and sand. Combined properties in Tantung of hardness, resistance to corrosion, erosion, impact and chipping have greatly reduced costly replacements in this type of equipment. Another application of merit has been the use of the cast alloy to replace sintered carbides in complex shape drawing dies of the type shown in fig 7. In this case the cast form was precision cast and used without further machining. The intricate shape would have necessitated costly diamond lapping operations on the cemented carbide die. Such dies, it was found, were 20 times as expensive initially as the same shape cast to form using Tantung. In addition, it was found that on production runs the cast Tantung form produced more feet of finished wire per die. Fig 8 shows a vegetable shredding blade cast from Tantung. This blade not only holds the cutting edge for a long period, but it is not easily chipped by tramp iron or foreign matter and is also highly resistant to acid corrosion.

The new alloy is not an across-the-board panacea for all the troubles which may confront a tool engineer. By the same token, there are many individual applications where its performance warrants its use, and on such jobs a precise metallurgical property is furnished through casting technique in which the duplication of shapes or forms is often secondary.

Wartime Technical Reports Available to Industry

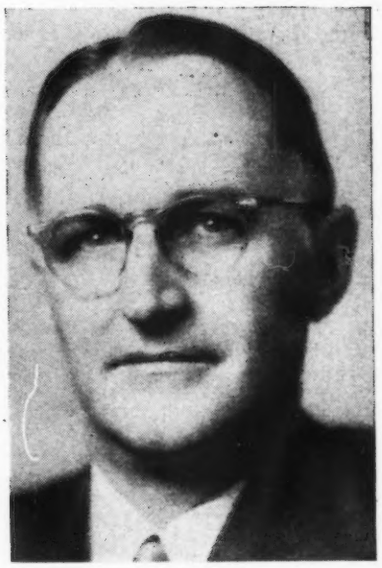
A SELECTED list of wartime technical research reports now available to industry through the Office of Technical Services, Washington, are shown below. This list includes reports of investigations conducted in this country during the war, as well as surveys of various German and Japanese industries and processes and supplements reports previously in THE IRON AGE under the title "German Wartime Technical Developments."

Copies of these reports may be obtained from the Office of Technical Services, Washington 25. When ordering copies give "PB" number (first column in table below) name of author and title and specify whether photostat or microfilm copy is desired. Cost of microfilm copies in the listing below is indicated by "M" in the price column; cost of photostats is indicated by "P."

P.B. No.	Author	Title	Date	No. of Pages	Price
949	G. M. Kline et al	Investigation of German Plastics Plants. Part 1.	1945	186	$2 M $13 P
25642	J. H. Rooney et al	Investigation of German Plastics Plants. Part 2.	1945	207	$7 M $21 P
32586	F. R. Hensel	Electrical Contancts. In German only.	1946	31	$1 M $3 P
30718	U. S. Bureau of Ordnance	Design of Inspection Gages	1945	102	$3 M $7 P
28893	W. Woodhall, and W. A. Cash	Titanium Pigments. Titangeselischaft, G.M.B.H., Leverkusen.	1946	18	$1 M $2 P
23999	Luftfahrt-forschungsanstalt	Yearbook of German Aeronautics Research. In German only.	1942	1543	$15.50 M $103 P
37804	G. E. Seil, et al	Manufacture of Refractories and Information Concerning Their Use in The Iron and Steel Industry of Western Germany.	1946	145	$3 M $10 P
30947	Herr Winkler	Dissociation Calculations.	1946	12	$1 M $1 P
31228	Otto Muck	Ironless Unipolar Machine.	1945	37	$1 M $3 P
27146	L. H. Germer et al	A Study by Means of Electron and X-Ray Diffraction of the Alteration of Steel by Hot Powder Gases.	1943	23	$1 M $2 P
30277	Alexander Squire	Powder Metallurgy: Influence of Film Treatment on the Characteristics of Finely Divided Iron Powder.	1945	9	$1 M $1 P
4416	Alexander Squire	Powder Metallurgy: Evaluation and Correlation of the Quality Characteristics of Powdered Iron Compacts.	1944	36	$.50 M $3 P
4420	Alexander Squire	Powder Metallurgy: Iron-Graphite Powder Compacts	1944	23	$.50 M $2 P
4419	Alexander Squire	Powder Metallurgy: Comparative Properties of 0.55 Carbon Steel Bars Formed by Conventional and Powder Metallurgy Methods.	1944	8	$.50 M $1 P
4418	Alexander Squire	Powder Metallurgy: Evaluation and Correlation of the Properties of Heat-Treated Iron-Graphite Powder Compacts.	1944	8	$.50 M $1 P
4417	Alexander Squire	Powder Metallurgy: Density as A Criterion of the Mechanical Properties of Iron Powder Compacts.	1944	28	$.50 M $2 P
32577	A. F. Hammimond, et al	Petrological Microscopes (Germany).	1945	15	$1 M $1 P
32163	Carlisle F. Smith	German Air Foam Fire Fighting Equipment.	1945	256	$8 M $18 P
31612	L. E. Pleva	Japanese Steel Manufacturing Methods.	1946	22	$1 M $2 P
15788	A. G. Ausergesellschaft, Berlin	Recipes for Zirconium Glazing Enamels. Experiences and Observations with Zirconium Glazing Enamels. Substitution of Tin with Zirconium Compounds. In German only.	1945	65	$1.50 M No P
32867	David W. Marchant	Industrial Application of the Betatron.	1946	17	$1 M $2 P
32583	E. C. Burton	Conveying Machinery and Allied Products.	1945	26	$1 M $2 P
34902	U. S. Quartermaster Corps Military Planning Division	Physical Apparatus for the Measurement of Thermal Transmission A technical description, including construction details, of the guard-ring flat-plate, the guard ring-cylinder, and the bronze foot.	1946	30	$1 M $3 P
547	Curtis E. Maier	Survey of the German Can Industry During Second World War.	1945	493	$5 M $33 P
25691	B. Bernstein	Report on Investigation of I. G. Farbenindustrie	1945	207	$5 M $14 P
30802	Arthur von Hippel	Ultrahigh Frequency Dielectrics. Progress report.	1942	51	$2 M $4 P
28755	A. M. Madle	Fuel Injection without Injection Pump.	1945	13	$1 M $1 P
30711	W. B. C. Perrycoste	German Carbon Electrode Manufacture at Griesheim (I.G.F.)	1946	13	$1 M $1 P
32159	G. B. Goodman, et al	German Pin and Allied Products Industry	1946	72	$2 M $5 P
32553	Myron A. Elliott, et al	Methods for Electrical and Chemical Identification of Plasticizers.	N.D.	37	$1 M $3 P
32273	G. M. Kline and I. G. Callomon	Manufacture of Laminates in Germany.	N.D.	20	$1 M $2 P
32639	T. H. Johnson, et al	Development of High Speed Between the Lens Photographic Shutters.	1942	65	$2 M $5 P

NATIONAL METAL SHOW

28th annual show at Atlantic City features well rounded technical program of 229 papers and 400 participants in equipment exhibition, stressing the dual goals of product improvement and lower production costs.



● Dr. C. H. Herty, Jr., assistant to vice-president, Bethlehem Steel Co., President ASM 1945-46.

A WEEK crammed with technical sessions, educational courses, annual meetings, dinners and banquet has been planned by four technical societies participating in the 28th consecutive annual National Metal Congress and Exposition, to be held in Atlantic City, Nov. 18-22. Supplementing the technological display of some 400 firms, the American Society for Metals, the American Institute of Mining & Metallurgical Engineers (both Iron and Steel Div. and Institute of Metals Div.), the American Welding Society and the American Industrial Radium & X Ray Society, will hold 79 simultaneous sessions and meetings at which a total of 229 papers and lectures will be presented, constituting the most intensive and comprehensive technical program ever presented at any previous Metal Congress.

The exposition promises to be an education in itself what with the large number of firms displaying their products and services covering virtually every phase of the production, fabrication and the use of metals. This impressive number of participants includes 57 metal producers, 45 firms in the furnace field, 50 to 60 firms active in the welding industry, 43 instrument manufacturers, and 36 metal cleaning and finishing firms, in addition to exhibitors displaying testing machines, laboratory supplies, machine tools, cutting tools and other metalworking equipment.

The various honorary lectures continue as always to highlight the technical sessions. The Campbell Memorial Lecture (ASM) will be delivered by James B. Austin, assistant director of the U. S. Steel Corp., research laboratories, Kearny, N. J., Wednesday morning. An eminent British physicist and theoretical metallurgist, Dr. William Hume-Rothery of Oxford University, has been selected to present a paper entitled "Electrons, Atoms, Metals and Alloys" at the 1946 annual lecture of the Institute of Metals Div. (AIME), Tuesday morning. An important feature of the AWS program is the Adams Lecture, which will be delivered Monday evening by Wendell F. Hess, head of the welding laboratory at Rensselaer Polytechnic Institute, Troy, N. Y., and president of AWS. The Mehl Lecture (X Ray Society) will be delivered by Herman E. Seemann of the Eastman Kodak Co. The title of his paper is "Photographic Aspects of Industrial Radiography."

The principal speaker at the annual banquet of the American Society for Metals, Thursday evening, will be Walter S. Tower, president of the American Iron & Steel Institute. Other events scheduled for the banquet include: (1) The award of the ASM Medal for the Advancement of Research to R. E. Zimmerman, vice-president in charge of research and technology, U. S. Steel Corp. of Delaware; (2) the Albert Sauveur Achievement Award to E. C. Bain, past president ASM and vice-president in charge of metallurgy and research, Carnegie-Illinois Steel Corp.; (3) the Henry Marion Howe Medal to C. R. Austin, Meehanite Metal Corp., and M. C. Fetzer, metallurgical department, Carpenter Steel Co., Reading, Pa.; and (4) the Past President's Medal to Kent R. Van Horn, president ASM 1945-1946.

The American Welding Society will also present various medals and awards at its annual dinner, Thursday evening. The more important presentations will include; (1) the Lincoln Gold Medal to be awarded to H. E. Kennedy, Berkeley, Calif., for his paper on "Some Causes of Brittle Failures in Welded Mild Steel Structures," and (2) the Samuel Wylie Miller Memorial Medal to J. F. Lincoln, Lincoln Electric Co., Cleveland.

No special awards will be presented by the American Institute of Mining & Metallurgical Engineers since these presentations were made earlier in the year at the society's annual meeting in Chicago.

The new president of American Society for Metals,

who will take office at the annual meeting, Wednesday morning, is Alfred L. Boegehold, head of the metallurgical department, Research Laboratories Div., General Motors Corp., Detroit. He will succeed Charles H. Herty, Jr., assistant to vice-president, Bethlehem Steel Co., who will remain on the board of trustees as past president. Francis B. Foley, superintendent of research, The Midvale Co., Philadelphia, will be installed as vice-president, and William H. Eisenman has been reelected as secretary. Two new trustees, elected to serve for 2 yr, are Arthur E. Focke, research metallurgist, Diamond Chain & Mfg. Co., Indianapolis, and John E. Dorn, associate professor of physical metallurgy, University of California.

New national officers of the American Welding Society will be inducted at the business session on Friday afternoon. At that time, L. W. Delhi, vice-president of Hunt, Mirk & Co., San Francisco, will succeed W. F. Hess of Rensselaer Polytechnic Institute as president. H. O. Hill, Bethlehem Steel Co. is to be the new first vice-president; G. N. Sieger, S-M-S Corp., second vice-president; O. B. J. Fraser, treasurer; and Miss M. M. Kelly, secretary.

During its annual meeting on Thursday afternoon, the American Industrial Radium & X Ray Society will also install new officers. A. F. Cota of A. O. Smith Corp., currently vice-president, will succeed Kent R. Van Horn, manager, Cleveland Research Div., Aluminum Co. of America Research Laboratories, as president. Don M. McCutcheon of Ford Motor Co. is currently treasurer and will become vice-president, while Dana W. Smith, research metallurgist, Glenn L. Martin Co., will be treasurer. Philip D. Johnson will continue as secretary.

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Correlated Technical Program of National Metal Congress

THE four participating societies have organized their programs so that (1) all technical programs and educational lectures of ASM will be held at Convention Hall, (2) all AIME meetings will be held in Hotel Claridge, (3) meetings of the AWS will be held at the Ambassador Hotel, and (4) all sessions of the Radium & X Ray Society will be held at the Seaside Hotel.

The ASM annual banquet will be held at the Traymore Hotel, while AIME and AWS will hold their annual dinners at the Claridge and Ambassador Hotels, respectively.

Monday, November 18

9:30 A. M.

Weldability

"Cracking and Ductility in the Heat-Affected Zone of Metal Arc Welds," by C. B. Voldrich, Battelle Memorial Institute. AWS

"An Investigation of the Effect of Welding on the Transition Temperatures of Navy High Tensile Low Alloy Steels," by G. G. Luther, R. E. Metius, C. E. Hartbower and F. H. Laxar, Naval Research Laboratory. AWS

"Influence of Geometrical Restraint and Temperature on the Toughness and Mode of Rupture of Structural Steel," by A. R. Anderson and A. G. Waggoner, Cramp Shipbuilding Corp. AWS

Electrodes

"The E601X Electrode Group," by Orville T. Barnett, Metal & Thermit Corp. AWS

"Some Recent Developments in the Manufacture of Fluxes for Automatic Submerged Arcwelding," by Dr. Willi M. Cohn, consulting engineer and physicist. AWS

"Development and Application of Lime Ferritic Electrodes," by D. L. Mathias and A. P. Bunk, Metal & Thermit Corp. AWS

Railroad

"Quantity Production of Railroad Passenger Cars by Resistance Welding," by A. M. Unger, Pullman-Standard Car Mfg. Co. AWS

"Locomotive Boilers — Welded Construction," by James Partington, American Locomotive Co. AWS

"Welded Freight Car Construction," by R. L. Rex, Air Reduction Sales Co. AWS

10:00 A. M.

"German Iron Ores Yield Vanadium," by R. P. Fischer. AIME

"Controlled Atmospheres from City Gas for the Heat Treatment of Steels," by I. Jenkins. AIME

● W. F. Hess, Rensselaer Polytechnic Institute, president AWS 1945-46.

"Production of Low Sulphur Sponge Iron," by R. C. Buehl, E. P. Shoub and J. P. Riott. AIME

Session No. 1

"The Development of a Turbosupercharger Bucket Alloy," by E. Epremian, General Electric Co. ASM

"The Stress Rupture and Creep Properties of Heat Resistant Gas Turbine Alloys," by N. J. Grant, Massachusetts Institute of Technology. ASM

"Structural Variations in Gas Turbine Alloys Revealed by the Stress-Rupture Test," by N. J. Grant, Massachusetts Institute of Technology. ASM

Session No. 2

"Some Special Metallographic Techniques for Magnesium Alloys," by P. F. George, Dow Chemical Co. ASM

"Calculation of Press Forging Pressures and Application to Magnesium Forgings," by R. L. Dietrich and G. Ansel, Dow Chemical Co. ASM

"Plastic Deformational Analyses on Pure Magnesium," by L. A. Carapella and W. E. Shaw, Mellon Institute of Industrial Research. ASM

Session No. 3

"Stability of Austenite in Stainless Steels," by C. B. Post and W. S. Eberly, Carpenter Steel Co. ASM

"The Cold Work Hardening Properties of Stainless Steel in Compression," by F. K. Bloom, G. N. Goller and P. G. Mabus, Rustless Iron & Steel

Div., American Rolling Mill Co. ASM

"Quantitative Evaluation of Intergranular Corrosion of 18-8 Ti," by F. J. Phillips, Carnegie-Illinois Steel Corp. ASM

10:30 A. M.

"Precipitation in Age-Hardened Aluminum Alloys," by A. H. Geisler and F. Keller. AIME

"Stress-Rupture and Creep Tests on Aluminum Alloy Sheet at Elevated Temperatures," by A. E. Flanagan, L. F. Tedsen and J. E. Dorn. AIME

2:00 P. M.

Research

"Arc Atmospheres and Underbead Cracking," by M. W. Mallett and P. J. Rieppel, Battelle Memorial Institute. AWS

"The X-ray Diffraction Study of the Effect of Residual Compression on the Fatigue of Notched Specimens," by J. T. Norton, D. Rosenthal and S. B. Maloof, Massachusetts Institute of Technology. AWS

"The Weldability of Ship Steels: Effects of Travel Speed, Preheat Temperature, and Arc Power Level on Notch Toughness," by Ernest E. Nippes and Warren F. Savage, Rensselaer Polytechnic Institute. AWS

"Some Observations on the Weldability of High Strength Wrought Aluminum Alloys," by W. R. Apblett, Naval Research Laboratory. AWS

Production

"Automatic Gas Shielded Welding," by G. J. Gibson, Air Reduction Sales Co. AWS

"Jigs and Fixtures for Automatic Fusion Welding," by L. J. Berkeley, Penn Tool & Machine Co., and E. D. Morris, The Linde Air Products Co. AWS

"Tool and Die Welding," by A. R. Butler and Frank E. Kessler, Welding Equipment & Supply Co. AWS

"Welding of Electric Apparatus," by E. F. Potter, Works Laboratory, General Electric Co. AWS

Storage Tanks and Pressure Vessels

"Field Erected Pressure Vessels," by Fred L. Plummer, Hammond Iron Works. AWS

"Dry Seal Gas Holders, All-Welded," by Rudolf Kraus, Stacey Bros. Gas Construction Co. AWS

"Submerged-Melt Welding in Pressure Vessel Fabrication," by N. G. Schreiner, The Linde Air Products Co. AWS

Session No. 1

"Ladle Deoxidation of Killed Steel With Silicon Carbide and Its Effect on Physical Properties and Hardenability," by E. A. Loria and A. P. Thompson, Mellon Institute of Industrial Research. ASM

"The Physical Chemistry of Acid Refining Process," by Yap Chu-Phay, National Resources Commission of China. ASM

"The Chromium-Oxygen Equilibrium in Liquid Iron," by Hsin-Min Chen, Carnegie-Illinois Steel Corp., and J. Chipman, Massachusetts Institute of Technology. ASM

Session No. 2

"The Precipitation Heat Treatment of Work Hardened 61S-W Aluminum Alloy," by J. J. Warga, Kaiser Fleetwings. ASM

"Constitution of the System Indium-Tin," by F. N. Rhines, W. M. Urquhart and H. R. Hoge, Carnegie Institute of Technology. ASM

"New Wrought Zinc Alloys Containing Small Amounts of Beryllium," by R. H. Harrington, General Electric Co. ASM

AIME Joint Session

"Hydrogen in Magnesium Alloys," by R. S. Busk and E. G. Bobalek. AIME

"Some Effects of Zirconium on the Extrusion Properties of Magnesium Base Alloys Containing Zinc," by J. P. Doan and G. Ansel. AIME

"An Electron Diffraction Study of Oxide Films Formed on Fe, Co, Ni, Cr and Cu at High Temperatures," by E. A. Gulbransen and J. W. Hickman. AIME

"An Electron Diffraction Study of Oxide Films Formed on Alloys of Fe, Co, Ni, and Cr at High Temperatures," by J. W. Hickman and E. A. Gulbransen. AIME

Metallography

"Hot Deformation Structures, Banding and Red-Shortness Cracks in Steel," by A. Hultgren and B. Herrlander. AIME

"Transformation of Austenite in an Aluminum-Chromium-Molybdenum Steel," by R. A. Grange, W. S. Holt and E. T. Tkao. AIME

"Effect of Alloys in Steel on Resistance to Tempering," by W. Crafts and J. L. Lamont. AIME

"Calculation of Tensile Strength and Yield Point from the Chemical Composition and Cooling Rate," by I. R. Kramer, P. D. Gorsuch and D. L. Newhouse. AIME

"Boron in Certain Alloy Steels," by M. C. Udy and P. C. Rosenthal. AIME

Joint Technical Session AIME

Magnesium—Oxide Films. AIME

8:00 P. M.

Adams' Lecture

"Adams' Lecture," by Dr. Wendell F. Hess, Rensselaer Polytechnic Institute. AWS

Tuesday, November 19

9:00-10:30 A. M.

Joint Technical Session AIME. Symposium arranged by M. Gensamer on "The Effects of Multiaxial Stresses on Metals":

"Mechanical Equation of State," by J. H. Hollomon. AIME

"A Statistical Theory of Fracture," by J. C. Fisher and J. H. Holloman. AIME

"A Thermodynamic Theory of the Fracture of Metals," by E. Saibel. AIME

9:30 A. M.

Research

"Computation of Cooling Time in Butt Welds," by D. Rosenthal, Massachusetts Institute of Technology. AWS

"Effect of Peening on Residual Welding Stresses," by E. Paul DeGarmo, Finn Jonassen and J. L. Meriam, University of California. AWS

"Welding of High Strength Steels with Ferritic Electrodes," by S. A. Herres and P. E. Woodward, Watertown Arsenal Laboratory. AWS

Resistance Welding

"Flashwelding of Concentrated Areas Up to 24 sq in. in SAE 1020, NE 9440, and NE 8620 Steels," by D. Bruce Johnston, McPhee & Johnston. AWS

"Resistance Welding of Spring Steel to Low Carbon Steel," by Arthur Willink, Registered Professional Engineer. AWS

"Design for Resistance Welding," by I. A. Crawford, Ex-Cell-O Steel Products Co. AWS

Machinery

"The Metallurgical Effect of Flame Hardening Application," by O. M. Harrelson, Georgia School of Technology. AWS

"The Evolution of Diesel Engine Block Weldment Designs," by James W. Owens, Fairbanks-Morse & Co. AWS

"Coordination of Engineering and Production in the Manufacture of Welded Products," by E. C. Brekelbaum, Harnischfeger Corp. AWS

10:00 A. M.

Session No. 1

"Bainitic Hardening of High-Speed Steel," by C. K. Baer and P. Payson, Crucible Steel Co. of America. ASM

"The Tempering of High-Alloy Tool Steels," by G. A. Roberts, A. H. Grobe and C. F. Moersch, Jr., Vanadium-Alloys Steel Co. ASM

"Changes in Size and Toughness of High-Carbon High-Chromium Steels Due to Subzero Treatments," by L.

E. Gippert and G. M. Butler, Jr., Allegheny Ludlum Steel Corp. ASM

Session No. 2

"Pole Figures of the Effect of Some Cold Rolling Mill Variables on Low-Carbon Steel," by J. K. Wood, Jr., Pennsylvania State College. ASM

"X ray Study of the Effect of High Hydrostatic Pressures on the Perfection of Crystals," by L. Rosen, Santa Fe, N. M. ASM

"A Periodic Chart for Metallurgists," by C. A. Zapffe, Baltimore, Md. ASM

Session No. 3

"Formation and Transformation Studies of Iron-Carbon Powder Alloys," by J. F. Kahles, University of Cincinnati. ASM

"Carbon Concentration Control," by E. G. de Coriolis, O. E. Cullen and Jack Huebler, Surface Combustion Corp. ASM

"Decarburization During Annealing of Malleable Iron," by H. A. Schwartz and J. Hedberg, National Malleable & Steel Castings Co. ASM

10:45 A. M.

1946 Institute of Metals Div. Annual Lecture by Dr. W. Hume-Rothery of Oxford University, England, "Electrons, Atoms, Metals and Alloys." AIME

2:00 P. M.

Research

"Redistribution of Residual Welding Stresses by Tensile Loading Along a Unionmelt Weld Joining Two 3x12 ft x 1 in. Plates," by J. L. Meriam, E. Paul DeGarmo and Finn Jonassen, University of California. AWS

"Welding Research as Applied in the South," by W. W. Austin, Jr., and E. N. Kemler, Southern Research Institute. AWS

"Welding of Hardenable Steels with High Alloy (Austenitic) Electrodes," by Miss A. M. Turkalo and Capt. S. A. Herres, Watertown Arsenal Laboratory. AWS

"An Investigation of the Phenomenon of Cleavage Type Fractures in Low Alloy Structural Ship Steels," by H. J. Gershenow and G. G. Luther, Naval Research Laboratory. AWS

Resistance Welding

"Resistance Welding with Storage Battery Power," by John D. Gordon, Progressive Welder Co. AWS

"A Summary of the Spotwelding of High Tensile Tensile Carbon and Low Alloy Steels," by W. D. Doty and Wylie J. Childs, Rensselaer Polytechnic Institute. AWS

"Selecting Spotwelding Schedules for Low Carbon Steel," by Julius Heuschkel, Westinghouse Electric Laboratories. AWS

● Kent R. Van Horn, manager, Cleveland Research Div., Aluminum Co. of America Research Laboratories, president of the American Industrial Radium & X Ray Society.

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Shipbuilding

"Some Problems of Welding Design and Fabrication of Steel Floating Dry Docks," by A. Amirikian, Bureau of Yards and Docks, Navy Dept. AWS

"Control of Welding Stresses by Welding Sequence," by Paul Field, Shipbuilding Div., Bethlehem Steel Co. AWS

"Discussion—Final Report of the Board to Investigate the Design and Methods of Construction of Welded Steel Merchant Vessels," by Comdr. R. D. Schmidtman, J. Lyell Wilson, and Finn Jonassen, Members of the Sub-board. AWS

Session No. 1

"A Rapid Method for Accurate Yield Stress Determination Without Stress-Strain Curves," by L. J. Ebert, M. L. Fried and A. R. Toole, Case School of Applied Science. ASM

"Folding in the Cupping Operation," by W. M. Baldwin, Jr., and T. S. Howard, Chase Brass & Copper Co. ASM

"Bearing Properties of 24S-T Sheet and Shear Strength of 24S-T Rivets at Elevated Temperatures," by A. E. Flanigan, L. F. Tedson and J. E. Dorn, University of California. ASM

Session No. 2

"Development of Temper Brittleness in Alloy Steels," by W. S. Pellini, American Brake Shoe Co., and B. R. Queneau, Carnegie-Illinois Steel Corp. ASM

"A Metallographic Etchant to Reveal Temper Brittleness in Steel," by J. B. Cohen, A. Hurlich and M. Jacobson, Watertown Arsenal. ASM

"Electrolytic Conductivity as a Method for Studying Electronic Transitions in Elements—Application to Iron, Nickel and Cobalt," by W. R. Ham and C. H. Samans, American Optical Co. ASM

2:00 P. M.

Joint Session AIME

"Some Factors Affecting the Particle Size of Tungsten," by B. Kopelman. AIME

"Spot Welding of Titanium," by R. S. Dean, J. R. Long, E. T. Hayes and D. C. Root. AIME

"The Melting of Molybdenum in the Vacuum Arc," by R. M. Parke and J. L. Ham. AIME

"Solubility of Hydrogen in Electrolytic Manganese and Transition Points in Electrolytic Manganese," by E. V. Potter and H. C. Lukens. AIME

"Work-Hardening and Rupture in Metals," by L. R. Jackson. AIME

"Comparison of Various Structural Alloy Steels by Means of the Static Notch-Bar Tensile Test," by G. Sachs, L. F. Ebert and W. F. Brown, Jr. AIME

"Plastic Flow of Aluminum Alloy Sheet Under Combined Loads," by W. T. Lankford, J. R. Low and M. Gensamer. AIME

"Problems in Unstable Flow Under Biaxial Stresses," by W. T. Lankford and E. A. Saibel. AIME

6:30 P. M.

Annual fall dinner of the Metals Div., AIME

Wednesday, November 20

9:30 A. M.

"Quantitative Measurements by Controlled Process Film of Two Million Volt X-Radiation," by D. T. O'Connor, Naval Ordnance Laboratory. X ray Society.

"Quantitative Relations Between the Photographic Response of Typical X-ray Films and the Quality of Radiation," by Dr. V. Hicks and Dr. H. W. Hoerlin, Ansco. X ray Society.

"Sliding Scales to Increase the Usefulness of Radiographic Exposure Charts," by Dr. H. E. Seeman and G. M. Corney, Eastman Kodak Co. X ray Society.

"Applications of G-M Counters to Measurement of X-ray and Gamma Ray Intensities," by Dr. Herbert Friedman, Naval Research Laboratory. X ray Society.

Cutting

"Automatic Oxyacetylene Operations," by S. D. Baumer, Air Reduction Sales Co. AWS

"Heavy Cutting Applications in Foundry and Steel Mill," by R. S. Babcock, The Linde Air Products Co. AWS

"Stainless Steel Cutting," by Howard Hughey, Air Reduction Sales Co. AWS

Resistance Welding

"Additional Timing Period of New Motor Driven Control Increases Gun Welder Speed," by H. I. Stanback. Square D Co. AWS

"Radiography and the Fatigue Strength of Spotwelds in Aluminum Alloys," by Robert C. McMaster and Horace J. Grover, Battelle Memorial Institute. AWS

"Resistance Welding." A General Electric film to be shown by L. D. T. Berg, General Electric Co. AWS

Structural

"H-Section Welded Trusses," by A. T. Waidelich, The Austin Co. AWS

"Welded Pier Leg, Shear Leg and Trolley of a 15-Ton Ore Bridge," by George F. Wolfe, Dravo Corp. AWS

"Recent Trends in Concepts of Design for Welded Steel Structures," by LaMotte Grover, Air Reduction Sales Co. AWS

10:00 A. M.

Annual Meeting, American Society for Metals

Edward de Mille Campbell Memorial Lecture, by J. B. Austin, U. S. Steel Corp.

2:00 P. M.

"Twin Relationships in Annealed Copper Strip," by P. Coheur and C. S. Barrett. AIME

"Twinning in Polycrystalline Magnesium," by C. S. Barrett and C. T. Haller. AIME

"Zinc Diffusion in Alpha Brass," by A. D. Smigelskas and E. O. Kirkendall. AIME

"The Alpha Solid-Solution Area of the Copper-Manganese-Aluminum System," by R. S. Dean, J. R. Long, T. R. Graham, A. H. Roberson and C. E. Armantrout. AIME

Applications of Radiography

"Design, Manufacture and Inspection of Welded Fabrications," by G. H. Campbell, A. O. Smith Corp. X ray Society.

"X-ray Inspection of Rocket Propellants," by J. E. Watkins, General Electric X-ray Corp. X ray Society.

"Radiography of Heavy Radioactive Materials," by G. H. Tenney, Los Alamos Project. X ray Society.

"Gamma Ray Radiography in a Small Steel Foundry," by R. A. Willey, Commercial Steel Casting Co. X ray Society.

● W. E. Brewster, general superintendent, International Harvester Co., Chicago, chairman of Iron and Steel Div., AIME.

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Resistance Welding

"Choice of Cable and Transformer Size for Portable Spotwelder," by Myron Zucker, Mackworth G. Rees. Inc. AWS

"Three-Phase Balanced Load Resistance Welding Machines," by Mario Sciaky, Sciaky Bros. AWS

"The Flash-Welding of Hard-Drawn High Carbon Steel Wire," by R. W. Bennett and R. D. Williams, Battelle Memorial Institute. AWS

Cutting

"Arc Oxygen Cutting on the Surface and Underwater," by Charles Kandel, Craftsweld Equipment Corp. AWS

"Powder Cutting and Scarfing of Oxidation-Resistant Materials," by D. H. Fleming, The Linde Air Products Co. AWS

"Some Recent Canadian Contributions to Oxygen Cutting," and Film *"No Keener Blade,"* by R. A. Dunn, Canadian Liquid Air Co., Ltd. AWS

"Oxygen Cutting of Steel at Elevated Temperatures," by J. F. Kiernan and J. S. Sohn, Air Reduction Sales Co. AWS

Welding Alloy Steels

"Investigation of the Weldability of Copper-Bearing Steels," by N. H. Keyser and C. H. Lorig, Battelle Memorial Institute. AWS

"The Control of Weld Hot Cracking in Nickel-Chromium-Iron Alloys," by T. E. Kihlgren and C. E. Lacy, The International Nickel Co., Research Laboratory. AWS

"Welding of High Tensile Alloy Steels in Postwar Applications," by Howard L. Miller, Republic Steel Corp. AWS

"Navy-E.E.S. Method for Determining the Applicable Welding Procedures for Steels," by Bela Ronay, U. S. Naval Engineering Experiment Station. AWS

Session No. 1

"Changes in Austenitic Chromium-Nickel Steels During Exposures at 1100° to 1700°F," by P. Payson and C. H. Savage, Crucible Steel Co. of America. ASM

"Cast Heat Resistant Alloys of the 16 Pct Chromium, 35 Pct Nickel Type," by H. S. Avery and N. A. Matthews, American Brake Shoe Co. ASM

"The Apparent Influence of Grain Size on the High Temperature Properties of Austenitic Steels," by C. L. Clark, Timken Roller Bearing Co. and J. W. Freeman, University of Michigan. ASM

Session No. 2

"A Study of Furnace Brazing as Applied to 12 Pct Chromium Low-Carbon Steel," by T. H. Gray, Westinghouse Electric Corp. ASM

"Stress Cracking of Electroplated Lockwashers," by K. B. Valentine, Pontiac Motor Div., General Motors Corp. ASM

"Nondestructive Inspection of Mine Hoist Cable," by P. E. Cavanagh, Allen B. Du Mont Laboratories, Inc., and R. S. Segsworth, General Engineering Co., Ltd. ASM

2:30 P. M.

"An Electrochemical Study of the Properties of Molten Slags of the Systems CaO-SiO_2 and CaO-Al_2O_3-SiO_2," by Lo Ching Chang and G. Derge. AIME

"Oxygen in Liquid Openhearth Steel, Oxygen Content During the Refining Period," by T. E. Brower and B. M. Larsen. AIME

"Oxygen in Liquid Openhearth Steel, Effect of Special Additions, Stirring Methods and Tapping," by T. E. Brower and B. M. Larsen. AIME

Thursday, November 21

9:30 A. M.

Pressure Welding

"Open Butt Oxyacetylene Compression Welding," by H. H. Chiswik, Air Reduction Sales Co. AWS

"Pressure Welding of Low Alloy Steels and Some Nonferrous Alloys," by K. H. Koopman, Union Carbide and Carbon Research Laboratories, Inc. AWS

"Welding of Stainless Steel Rings," by C. J. Burch, The Linde Air Products Co., A. L. Rustay, Stephen Jablonski

and Alan Crowell, Wyman-Gordon Co. AWS

"Pressure Gas-Welding of Alloy Steel Tubing," by Z. L. Zambrow and R. D. Williams, Battelle Memorial Institute. AWS

Aircraft

"Design and Production Control Silver Alloy Brazed Joints in Aircraft Structures," by H. A. Smith and P. A. Koerner, Beech Aircraft Co. AWS

"Resistance Welding Test Methods Used to Maintain Quality in the Manufacture of the 140 Jet Engine," by P. G. Parks, Solar Aircraft Co. AWS

"Welding Problems in Jet Propulsion —Stainless Steel," by E. J. DeWitt and Mr. Lammers, Wallace Supplies Mfg. Co. AWS

Hardfacing

"Repairing Contractors and Steel Mill Equipment with Manganese Application Bars," by L. A. Davis, Manganal Div., Stulz Sickles Co. AWS

"How to Select Wear Resisting Alloys for Welding," by Joseph A. Cunningham, J. A. Cunningham Equipment, Inc. AWS

"Microstructure of Hardfacing Alloys," by H. W. Sharp, Stoody Co. AWS

"Composite Construction by Building Up Surfaces with Submerged-Melt Welding," by J. E. Taylerson, The Linde Air Products Co. AWS

Radiation Methods for Fine Structure Analysis

"A Study of the Microstructure of Some Non-Ferrous Alloys by Means of Microradiography," by L. Conant, Lithaloys Corp. X ray Society.

"X-ray and Optical Micrography as Essentials to Correlation of Radiographic Appearance with the Serviceability of Metal Parts," by Dr. L. W. Ball, Naval Ordnance Laboratory. X ray Society.

"Microscopy and Analysis with Electrons," by Dr. J. Hillier, Radio Corp. of America. X ray Society.

"Short Source-Object-Distance Exposure Techniques in Spotweld Radiography," by Dr. R. C. McMaster, Battelle Memorial Institute. X ray Society.

10:00 A. M.

Session No. 1

"The Interrupted Quench and Its Practical Aspects," by H. E. Boyer, American Bosch Corp. ASM

"Experimental Studies of Continuous Cooling Transformations," by C. A. Liedholm, Curtiss-Wright Corp. ASM

"Isothermal Transformation of Austenite," by A. Hultgren, K. Teknisha Hogskolan, Sweden. ASM

● E. A. Anderson, metallurgist, New Jersey Zinc Co., Palmerton, Pa., acting chairman Institute of Metals Div., AIME.

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Session No. 2

"Influence of Strain Rate and the Stress System on the Mechanical Properties of Copper," by D. J. McAdam, Jr., G. W. Geil and D. H. Woodard, National Bureau of Standards. ASM

"Copper-Manganese Alloys—the Properties of Cold Worked and Annealed Alloys Containing 2 to 20 Pct Manganese," by R. S. Dean, J. R. Long, T. R. Graham and D. P. Sugden, U. S. Bureau of Mines. ASM

"Age Hardening Copper-Cobalt-Manganese Alloys," by J. W. Fredrickson, University of Utah. ASM

Session No. 3

"Mechanical Properties of Cast Low-Alloy Steels," by M. F. Hawkes, Carnegie Institute of Technology. ASM

"Kinetics of Solidification of Killed Steel Ingots," by J. W. Spretnak, Carnegie Institute of Technology. ASM

"Ingot Factors in the Production of Seamless Gun Tubes," by J. W. Spretnak, Carnegie Institute of Technology, K. L. Fetters, Youngstown Sheet & Tube Co. and E. L. Layland, Westinghouse Electric Corp. ASM

2:00 P. M.

Annual Meeting. X ray Society

Election of Officers. X ray Society.

The Retiring President's Address. X ray Society.

1946 Mehl Lecture — *"Photographic Aspects of Industrial Radiography,"* by Dr. H. E. Seemann, Eastman Kodak Co. X ray Society.

Mehl Lecture Award—X ray Society, by Dr. K. R. Van Horn.

Session No. 1

"The Measured Knoop Hardness of Hard Substances and Factors Affecting Its Determination," by N. W. Thibault and H. L. Nyquist, Norton Co. ASM

"Determination of Knoop Hardness Numbers Independent of Load," by L. P. Tarasov and N. W. Thibault, Norton Co. ASM

"Hardenability of Shallow Hardening Steels Determined by the PV Test," by B. F. Shepherd, Ingersoll-Rand Co. ASM

Session No. 2

"The Effect of Composition on the Fatigue Strength of Decarburized Steel," by L. R. Jackson and T. E. Pochapsky, Battelle Memorial Institute. ASM

"Transformations in Krupp-Type Carburizing Steels," by A. R. Troiano and J. E. DeMoss, University of Notre Dame. ASM

"Precipitation in a Magnesium Sheet," by C. T. Haller, International Nickel Co. and C. S. Barrett, Institute for the Study of Metals, University of Chicago. ASM

7:00 P. M.

Annual Dinner, American Welding Society

Friday, November 22

9:30 A. M.

"Logarithmic Step-Tablet for X rays," by G. M. Corney, Eastman Kodak Co. X ray Society

"Further Studies of High Voltage Radiography," by E. D. Trout, General Electric X-ray Corp. X ray Society.

"Radiographic Specifications, Their Nature, Purpose and Current Revisions," by J. J. Pierce, Naval Ordnance Laboratory. X ray Society.

High Alloys

"An Attempt to Select a Suitable Specimen for the Study of Corrosion Cracking in 18-8 Steel," by D. S. McKinney, Carnegie Institute of Technology. AWS

"Welding and Other Fabrication Methods for Hastelloy Alloys," by C. G. Chisholm, Haynes Stellite Co. AWS

"Effect of Alloying Elements on the Tensile Properties of 25-20 Weld Metal," by Hallock C. Campbell and R. D. Thomas, Jr., Arcos Corp. AWS

Miscellaneous

"The Arcwelding of Cast Iron with Nickel Electrodes," by T. E. Kihlgren and L. C. Minard, The International Nickel Co., Reserach Laboratory. AWS

"The Welding of High Temperature, High Pressure Steel Valves," by Vincent Malcolm, Chapman Valve Co. AWS

"Static and Fatigue Tests of Arc-welded Aluminum Alloy 61S-T Plate," by E. C. Hartmann, Marshall Holt and A. N. Zamboky, Aluminum Research Laboratories. AWS

"Submerged-Melt Welding of Corrosion-Resisting Metals," by H. J. Roberts, Linde Air Products Co., and R. J. Anderson, Dominion Oxygen Co., Ltd. AWS

"Production Applications of Inert Gas-Shielded Arcwelding" by H. T. Herbst, Linde Air Products Co. AWS

"A New Semiautomatic Arcwelding Process," by J. M. Tyrner, Air Reduction Sales Co. AWS

10:00 A. M.

Session No. 1

"Carburized Cases of Hypo-Eutectoid Carbon Content," by P. C. Rosenthal and G. K. Manning, Battelle Memorial Institute. ASM

"Carbide and Oxide in Surface Zones of Carburized Alloy Steels," by A. Hultgren and E. Hagglund, K. Tekniska Hogskolan, Sweden. ASM

"Hardness Testing of Metals and Alloys at Elevated Temperatures," by F. P. Bens, Climax Molybdenum Co. of Michigan. ASM

Session No. 2

"The Effects of Microstructure on the Mechanical Properties of Steel," by J. H. Hollomon, L. D. Jaffe, D. E. McCarthy and M. R. Norton, Watertown Arsenal. ASM

"Metallurgical and Structural Investigation of Steel Castings for Aircraft," by L. W. Smith and L. D. Morris, Cornell Aeronautical Laboratory, ASM

"Factors Influencing the Pearlitic Microstructure of Annealed Hypo-Eutectoid Steel," by R. A. Grange, U. S. Steel Corp. ASM

Session No. 3

"The Effect of Manganese on the Properties of Cast Carbon and Carbon-Molybdenum Steels," by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co. ASM

"Relation of Quenching Rate and Hardenability to the Mechanical Properties of Several Heat Treated Cast Alloy Steels," by C. R. Wilks, H. S. Avery and E. Cook, American Brake Shoe Co. ASM

"A Laboratory Study of Quench Cracking in Cast Alloy Steels," by M. C. Udy and M. K. Barnett, Battelle Memorial Institute. ASM

2:00 P. M.

"Practical Importance of Hydrogen in Metal-Arc Welding of Steel," by S. A. Herres, Battelle Memorial Institute. ASM

"Effect of Composition, Heat Treatment, and Cold Work on the Hydrogen Embrittlement of Stainless Steel Wire During Cathodic Pickling," by C. A. Zapffe, Baltimore, and O. G. Specht, Jr., Grede Foundries. ASM

"Acid Composition, Concentration, Temperature and Pickling Time as Factors in the Hydrogen Embrittlement of Mild Steel and Stainless Steel Wire," by C. A. Zapffe and M. E. Haslem, Baltimore. ASM

"Measurement of Embrittlement During Chromium and Cadmium Electroplating and the Nature of Recovery of Plated Articles," by C. A. Zapffe and M. E. Haslem, Baltimore. ASM

Non Destructive or Allied Test Methods

"Spectographic Analysis of Cartridge Brass," by M. M. White, Willys-Overland Motors, Inc. X ray Society.

"Proof Loading—An Essential Non Destructive Test," by J. C. New, Naval Ordnance Laboratory. X ray Society.

"Analysis of Drillings and Chips by Sintering Pellets of the Material," by M. M. White, Willys-Overland Motors, Inc. X ray Society.

"Testing Metals for Internal Discontinuities with Supersonic Echoes," by J. W. Dice, Sperry Products, Inc. X ray Society.

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Exhibitors at the National Metal Congress and Exposition

Nearly four acres of space will be occupied by some 400 exhibitors on both floors of the Atlantic City municipal auditorium. Admission is by membership card in a technical society, by business card, or by invitation.

LIST OF EXHIBITORS

Exhibitor	Booth No.
Acme Electric Welder Co.	G224
Acme Tool Co.	B232
Acro Welder Mfg. Co., Inc.	G224
Aircraft Screw Products Co., Inc.	B202
Air Reduction Sales Co.	A152
Ajax Electric Co., Inc.	B155
Ajax Electrothermic Corp.	B147
Allis-Chalmers Mfg. Co.	C251
Alox Corporation	A163
Alvey-Ferguson Co., The	A230
American Emblem Co.	H176
American Foundry Equipment Co.	B115
American Gas Association	G169
American Gas Furnace Co.	G169
American Machinist	F169
American Metal Market	H227
American Photocopy Equipment Co.	J232
American Smelting & Refining Co. (Federated Metals Division)	E178
American Society for Metals	F181
American Society for Metals (New Jersey Chapter)	D224
American Steel Castings Co.	A109
American Technical Society	H224
American Welding Society	D180
Ampco Metal, Inc.	B214
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Anderson & Sons	A173
Arcos Corporation	A115
Atlas Fence Co.	G207
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Baird Associates	F247
Baker & Co., Inc.	C225
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Bastian-Blessing Co., The	E120
Bausch & Lomb Optical Co.	B152
Bergen Precision Castings, Inc.	C162
Better Finishes & Coatings Inc.	A158
Black Drill Co.	C109
Blakeslee & Co., G. S.	D205
Bowser, Inc. (Refrigeration Division)	G238
Bristol Co., The	C142
Brown Instrument Co.	B105
Bruning Co., Inc., Charles	G142
Brush Beryllium Co.	G214
Bryant Heater Co.	G169
Buehler, Ltd.	D119
Burkay Co.	B173
By-Products Steel Corp.	D155
Cambridge Wire Cloth Co.	F210
Canadian Radium & Uranium Corp.	F209
Carbomatic Corp.	G169
Carpenter Steel Co., The	C169
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Delaware Tool Steel Corporation	B180
Dempsey Industrial Furnace Corp.	B132
Denison Engineering Co.	F135
deSanno & Son, Inc., A. P.	A181
Detroit Testing Machine Co.	B158
Diamond Machine Tool Co.	H246
Die Casting	F238
Dietert Co., Harry W.	C120
Diversey Corporation, The	B143
DoAll Co., The	B139
Donovan Co.	G211
Drever Company	C229
Driver Co., Wilbur B.	E238
DuMont Laboratories, Allen B.	E221
Duraloy Co., The	F176
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East Shore Machine Products Co.	1232
Eastman Kodak Co.	C155
Ecco High Frequency Corporation	A133
Eclipse Fuel Engineering Co.	G169
Eisler Engineering Co.	F227
Electric Furnace Co., The	D169
Electroloy Co., Inc., The	G224
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Gamma Instrument Co., Inc.	H143
Garret Co., George K.	A237
Gas Machinery Co.	G169
Gehnrich & Gehnrich, Inc.	G169
General Alloys Co.	D109
General Aniline & Film Corp.	F204
General Electric Co.	H139
General Electric X-Ray Corp.	H139
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Goodwin Co.	1232
Gordon Electronics, Inc.	F134
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Grobet File Co. of America	B238
Gulf Oil Corporation	D108
H & H Research Co.	B232
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Hammond Machinery Builders, Inc.	A138
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Heller Brothers Co.	D227
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Holliday & Co., W. J.	G119
Hollup Corp.	E119
Hones, Inc., Charles A.	G169
Houghton & Co., E. F.	D115
Huppert Co., K. H.	C173
Illinois Testing Laboratories, Inc.	A245
Induction Heating Corporation	D162
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Industrial Press, The	B246
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Motch & Merryweather Machinery Co., The	C232
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National Cylinder Gas Co.	E119
National Diamond Laboratory	F240
National Electric Welding Machines Co.	G224
National Industrial Publishing Co.	B208
National Pneumatic Co.	D249
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New England Auto Products Corp.	E245
New Equipment Digest	A105
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Ohio Crankshaft Co., The	F179
Olsen Testing Machine Co., Tinius	F109
O'Neil-Irwin Manufacturing Co.	G185
Ozalid	F204
'Pacific Northwest'	G221
Pangborn Corporation	H173
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Power-Pak Floor Machine Co.	G203
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Precision Welder & Machine Co.	G224
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Progressive Welder Co.	J220
Pulmosan Safety Equipment Corp.	C159
Purchasing	D210
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Ransome Machinery Co.	A125
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Stearns-Roger Mfg. Company, The	H180
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Stevens & Co., C. H.	A215
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Sun Oil Company	F105
Sunbeam Corporation	D163
Super Tool Company	A129
Superior Tube Company	E109
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Welding Sales & Engineering Co.	G224
Weltronic Company	F224
Westinghouse Electric Corporation	C125
Wheelco Instruments Company	F108
Wilson Mechanical Instrument Co., Inc.	B159
Wood Products Corporation, J. R.	G245
Yale & Towne Mfg. Company, The	D147

Resinous Sealants for Porous Castings

THE production of castings capable of retaining liquids or gases under pressure is a foundry problem that frequently entails considerable difficulties. In porous castings internal cavities exposed during machining may provide passageways for leakage when the castings are placed in service.

Some alloys which have rather wide solidification ranges, such as certain magnesium alloys, are quite susceptible to microshrinkage. Castings of magnesium alloys, used as containers for fluids under slight pressure, therefore are frequently treated with sealants to prevent leakage. Such treatments have been satisfactory in light metal castings for low pressure service, but the problem of eliminating porosity in castings of other metals that have to operate under more severe conditions of temperature and pressure, is more difficult.

A satisfactory sealant should have low viscosity and good wetting properties so that it can penetrate readily into small voids. It also should be reasonably stable during storage in the liquid state. In curing it should form a resilient, adherent solid unaffected by moderately high temperatures and reasonably inert when exposed to hot oil, gasoline, water, and other common solvents.

Of the materials mentioned in earlier literature some are satisfactory as sealants in certain applications, but none of them can be regarded as a universal sealant. Because of the many recent developments in the field of plastics the National Bureau of Standards decided to investigate the effectiveness and durability as sealants of a number of available liquid synthetic resins. The investigation, conducted by Vernon C. F. Holm of the bureau, attempted to establish the sealing efficiency of several different resins, and durability tests were conducted on specimens treated with the most efficient sealants.

The porous specimens that were used in this investigation were bushings 2 in. od and 2 in. long, with a wall thickness of ⅛ in. Some were cast to size and machined on the ends only. Others were cast oversize and machined inside and outside to dimensions. The materials were commercial aluminum, an alloy of copper and 3½ pct Si, and red brass (85 pct Cu and 5 pct each of Pb, Sn and Zn). Some of the specimens had been prepared previously for another investigation; others were cast especially for this work with the melting and casting conditions controlled to favor the development of the desired amount of porosity. For the aluminum specimens this involved heating the metal to about 1600°F (250°F above the normal maximum heating temperature) which tends to develop a coarse structure and also favors gas absorption. In casting the copper alloy specimens, some of the mold surfaces were moistened with kerosene to insure the development of porous castings.

The degree of porosity in each specimen was determined by a hydrostatic pressure test. Some specimens showed considerable leakage at pressures as low as 25 psi and water was emitted as a steady spray when the pressure was increased to 100 psi. Others showed only slight signs of leakage at 600 psi. Specimens that could withstand a pressure of 600 psi for 5 min without leaking were considered sound, and this criterion was adopted as a basis for judging the success of the sealing treatments.

Examinations of sections of porous specimens showed that most of the porosity was due to microshrinkage and consisted of cavities along the grain boundaries. The maximum width of cavity observed in any specimen was about 0.002 in., but most of the cavities were much smaller.

An impregnating chamber was used that permitted treatment of ten specimens at one time with about ½ gal of resin. The ten specimens used for each test were selected so that specimens of reasonably comparable

porosity were treated with each resin. The procedure consisted in placing the cleaned and dried specimens in the chamber, closing all openings except the one to the vacuum pump, and evacuating to a vacuum of 28 or 29 in. of Hg for 1 hr. Then sufficient sealant was drawn in to cover the specimens and an air pressure of 75 psi applied for 1 hr. After the pressure was released, the sealant was withdrawn and the specimens were allowed to drain.

The results of the sealing treatments with the various resins as indicated by pressure tests are shown in table 1. In this table the sealants are arranged according to arbitrarily assigned numbers with the type of resin indicated. For some of the resins, data are given to show the effect of a second treatment on the specimens that had not been completely sealed in the initial treatment. Only four of the resins successfully sealed 46 pct or more of the specimens in one treatment. One of these, No. 3, showed a sealing efficiency of 46 pct in the initial treatment but indicated no improvement in the second treatment. Resin No. 5 sealed 50 pct of the test specimens in one treatment, but the curing of this resin was catalyzed by contact with copper even at room temperature and the bronze specimens became coated with a solid material during impregnation, which was exceedingly difficult to remove. Two of the sealants, No. 13 and No. 14, made the best showing. No. 13 is a phenolic resin in alcohol solution and is recommended by the manufacturer for eliminating leakage in all types of metals and alloys. No. 14 is a styrene-polyester resin developed particularly for sealing aluminum and magnesium castings. In the initial treatment No. 13 sealed 58 pct of the specimens tested and No. 14 sealed 47 pct. After two treatments the total percentages sealed were 79 pct and 86 pct, respectively, for the two resins.

As these two resins were the only ones that yielded reasonably satisfactory results in the sealing treatments, durability tests were confined to specimens repaired with these sealants.

Of 14 resins tested to determine their efficiency as sealants, only two showed promise in this respect. Even these two resins sealed only 50 pct of the specimens subjected to one treatment but a second impregnation increased the sealing efficiency to about 80 pct. As a double treatment does not insure complete sealing, it is necessary to test all castings to identify those which have not been sealed. This undesirable feature necessarily limits the value of the process, and for that reason the use of sealants, except in some special applications, probably will be resorted to only in emergencies.

Regardless of the circumstances requiring the use of a given sealant, its durability under service conditions should be given first consideration. The results of the tests indicated that a resin may be decidedly superior for one type of exposure but may be of questionable value under other service conditions. Thus the styrene-polyester resin (No. 14) was considerably more satisfactory than the phenolic resin (No. 13) in exposure to petroleum products, while the phenolic resin was superior for elevated temperature conditions. In addition, the phenolic resin required the application of higher pressures to produce failure at room temperatures. Both resins were reasonably stable in exposure to boiling water. Under thermal shock conditions the polyester resin (No. 14) was decidedly superior. Undoubtedly this is due to the fact that the latter forms a resilient material upon curing whereas the phenol-formaldehyde resin is converted into a glassy, brittle mass that fractures readily as the casting expands and contracts.

Although impregnation with sealants now available may be a useful method for rendering certain types of porous castings pressure tight for limited service conditions, the results of this investigation suggests that in general the production of leak-proof castings remains essentially a foundry problem.

TABLE I

Results of Sealing Treatments With Different Resins as Indicated by Pressure Tests[a]

Type of Resin	Number of Porous Specimens Treated	Percentage of Specimens Sealed In— 1 Impregnation	2 Impregnations	Remarks
(1) Styrene-polyester [b]	10	20	20	
(2) Styrene-polyester [b]	10	20	.....	
(3) Phenolic [b]	13	46	46	Resin has high solids content.
(4) Styrene-polyester [c]	12	33	66	
(5) Polyester [c]	10	50	.....	
(6) Unsaturated polyester [c]	10	20	30	
(7) Unsaturated polyester [c]	10	30	.....	Resin No. 6 with wetting agent.
(8) Styrene-alkyd [c]	10	30	.....	
(9) Phenol-formaldehyde [c]	10	30	.....	Low molecular weight resin.
(10) Resorcinal-formaldehyde [c]	9	11	.....	Fast-curing resin.
(11) Styrene-alkyd [c]	10	20	.....	
(12) Phenolic with siliceous filler [b]	10	10	.....	Resin contains 65 pct solids.
(13) Phenolic [b]	38	58	79	Resin contains 52 pct solids.
(14) Styrene-polyester [d]	36	47	86	

[a] Specimens were tested at a hydrostatic pressure of 600 psi for 5 min.
[b] Recommended by the manufacturer for general use.
[c] Resins not marketed as sealants.
[d] Recommended by the manufacturer for aluminum or magnesium alloys.

Adhesive Outlasts Metal in Fatigue Tests

FATIGUE tests given two pieces of 1/16-in. thick duralumin cemented together with a new plastic adhesive have shown that the adhesive actually is stronger under bending stresses than is the metal itself. The tests were conducted by the Sonntag Scientific Corp. on a Baldwin model SF-01-U universal fatigue testing machine as a part of an ASTM project.

Fifteen specimens of the 24ST aluminum alloy were used in the tests. Repeated alternating loads up to five million load cycles were applied to the specimens and in all cases except one the adhesive held while the metal itself fractured. The adhesive parted in only one of the tests. These tests were said to indicate that it may be possible to use the adhesive to glue metal aircraft parts together rather than rivet them. Such practice could materially reduce the surface drag of airplane wings and fuselage.

Alloys For High Temperature Service

By W. O. BINDER
Electro Metallurgical Co., New York

The effects of strain hardening, heat treatment, and grain size control, in enhancing desirable qualities of the various types of alloys for high temperature service are reviewed, supported by quantitative test data. The author also stresses the importance of characteristics such as fatigue endurance, damping capacity and weldability in determining the suitability of the alloys for use at elevated temperatures.

STRUCTURAL nonuniformity brought about by the improper manufacturing processes may have an adverse influence on strength at elevated temperatures. Since creep is involved in grain boundary movements, any weakening of the boundaries resulting from large numbers of nonmetallic inclusions will result in the lowering of strength. Excessive chemical segregation will act in a similar manner. Little is known as yet about the effect of melting practice, ingot size and degree of reduction during hot-fabrication on the distribution of the alloy elements and nonmetallic inclusions, but the influence which these factors are known to have on metals at room temperature indicates that they will have to be closely considered.

In the first part of this two-part article published in THE IRON AGE, *Nov. 7, 1946, p. 46, the author discussed* (1) *the qualifications of metals,* (2) *the methods of evaluating alloys for high temperature service, and* (3) *effects of alloying elements on high temperature properties.*

The use of strain-hardening as a means of improving the strength of metals at ambient temperatures is commonplace. At elevated temperatures it is also possible to gain strength by recourse to strain-hardening. The extent to which it may be utilized is a function of the temperature of operation and the composition of the metal. At temperatures above the recrystallization or recovery temperature, prior strain-hardening of the metal is detrimental as it increases the rate of creep, whereas at temperatures below recovery of the metal, strain-hardening processes are very helpful.

Strain-hardening has an accelerating effect on precipitation of phases from solid solution. Thus, if the alloy is in a supersaturated condition, strain-hardening brings about precipitation at temperatures where its influence normally would be ineffective because of the slow rate of precipitation.

Prior treatment of the strain-hardened metal governs its strength and ductility. As shown in table X,[10] solution heat treatment of low carbon N-155 alloy prior to strain-hardening markedly raises strength, although with some loss in ductility. Precipitation heat treatment after solution heat treatment greatly improves ductility without too much sacrificing of strength. It may be concluded from these data that much improvement in the strength and ductility of metals will be attained by studying the effects of processing variables prior to strain-hardening.

[10] *E. E. Reynolds and J. W. Freeman, "Various Investigations in Progress for the National Advisory Committee for Aeronautics at the University of Michigan," University of Michigan Progress Report, Sept. 4, 1945.*

Of course, there is always the possibility that overaging may occur because of the accelerating effect of strain-hardening on precipitation. To some extent this can be controlled; for example, it can be decreased by regulating the amount of stress employed or by keeping the temperature of operation low.

The temperature above which strain-hardening methods of gaining high-temperature strength are inadequate because of crystal recovery, is in the vicinity of 1350°F for all the recently developed wrought alloys. This fact is illustrated in fig. 11, which shows the variation in elongation and rupture-life of low carbon N-155 alloy in the cold hot-worked condition at 1500°F under a constant stress of 8000 psi. It is noted that the resistance to creep may vary widely, depending upon the conditions during hot working, yet none of the conditions of hot working employed in these tests were abnormally different as shown in table XI, from accepted commercial practice. To gain creep strength at higher temperatures than about 1350°F, heat treatment which renders the metal susceptible to precipitation-hardening effects, is necessary. The influence of heat treatment on creep resistance is illustrated in fig. 12, which shows the elongation characteristics of the

TABLE X

Effect of Various Types of Hot-Cold Work on Rupture Properties of Low Carbon N-155 Alloy For 1000 hr life at 1200°F

Condition of Metal	Stress, Psi	Elongation in 1½ in., Pct
As-rolled	38,000	35
As-rolled and hot-cold-worked	45,000	12
Solution-treated	37,000	8
Solution-treated and hot-cold-worked	52,000	6
Solution-treated and aged	42,000	25
Solution-treated, aged, hot-cold-worked	47,000	15

same series of alloys shown in fig. 11. Heat treatment for 1 hr at 2280°F, and air cooling, has eliminated the extreme variations observed in fig. 11, and the alloy shows a marked degree of uniformity. Table XII illustrates more specifically the benefits to be derived from heat treatment.

The heat treatment factor is, to a large extent, overlapping with chemical composition and grain size factors, and it cannot be distinctly separated from them. There are, however, a number of variables involved in heat treatment that significantly affect creep strength to render the heat treatment factor worthy of some discussion. As would be expected, varying the conditions of heat treatment affects the results obtained. For example, strength is a function of the solution heat-treating temperature and the time of holding at that temperature, as they control the amount of alloy going into solid solution as well as its homogeneity. Strength is affected by the rate of cooling after solution heat treatment as this controls the distribution of the precipitate with respect to grain areas and grain boundaries. The rate of cooling should be as rapid as possible to guard against excessive precipitate forming at grain boundaries, where they are least effective. Creep strength is further influenced by the temperature of formation of the precipitate, as it is extremely sensitive to changes in the particle size of the precipitate. Very little is known about this aspect, and further progress in high-temperature alloy development will depend to a great extent on knowledge of how precipitate particle size affects strength.

With strength depending upon precipitation-hardening effects, there is the ever present possibility of having failure occur prematurely because of overaging. The only metallurgical control against such possibilities is to select compositions which tests indicate to have maximum resistance to structural instability at the service temperature.

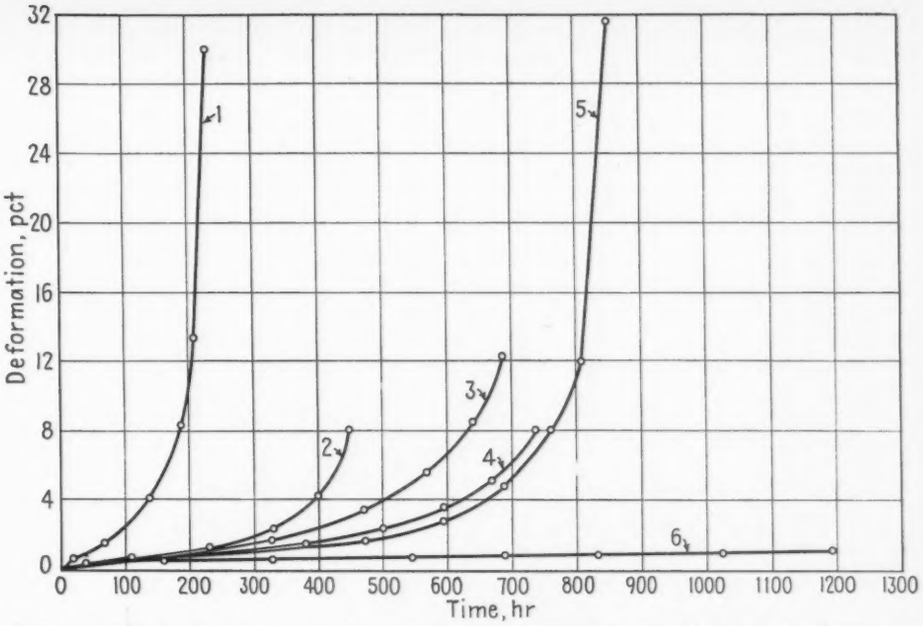


FIG. 11—Effect of various types of prior hot-work on elongation of N-155 alloy at 1500°F under constant stress of 8000 psi.

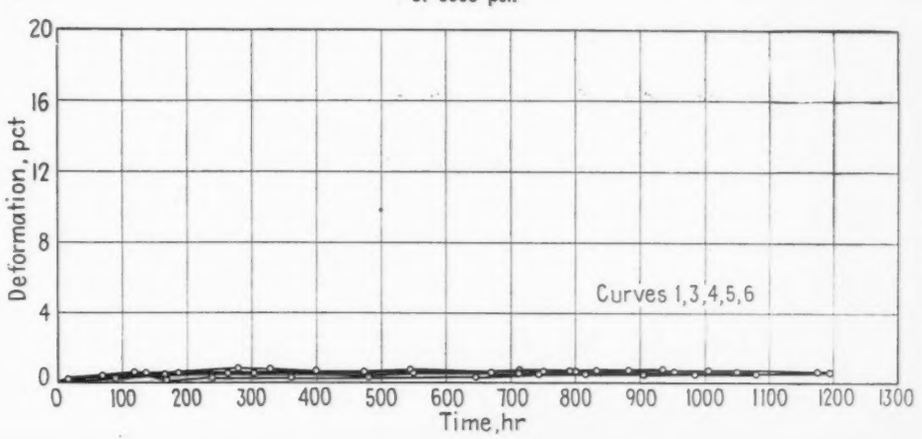
Effect of Grain Size

A number of investigations have shown that large grain size is inherently more stable than a fine grain, but there is no convincing explanation of the effect of grain size on creep rate. Creep resistance has been found to increase with grain coarsening until the average effect of the crystals is influenced by the directional properties of individual crystals. The general superiority of cast metal over wrought metal at temperatures above 1200°F is attributed to the coarseness of their grain structure, other factors being the same.

The effect of grain coarsening has received very little systematic attention in the case of the new wrought alloys, but has been of considerable interest to the manufacturer of cast alloys, as grain coarsening affects ductility, toughness, fatigue resistance, and weldability, as well as creep. Because cast alloys may vary in grain size to a greater extent from lot to lot than wrought alloys, the problem is to determine what variables must be controlled in order to get consistent results.

The investment casting process is used very extensively for the production of heat-resisting cast articles from the cobalt-base type alloys, which are difficult to machine. The molds for such castings are heated to about 1800°F for the purpose of setting the mold materials and assisting the flow of metal into all parts of the casting. The effect of mold temperature and metal temperature thus have an important influence on grain size, as well as other properties of the casting.

FIG. 12—Effect of heat treatment on elongation of N-155 alloy at 1500°F, under constant stress of 8000 psi.



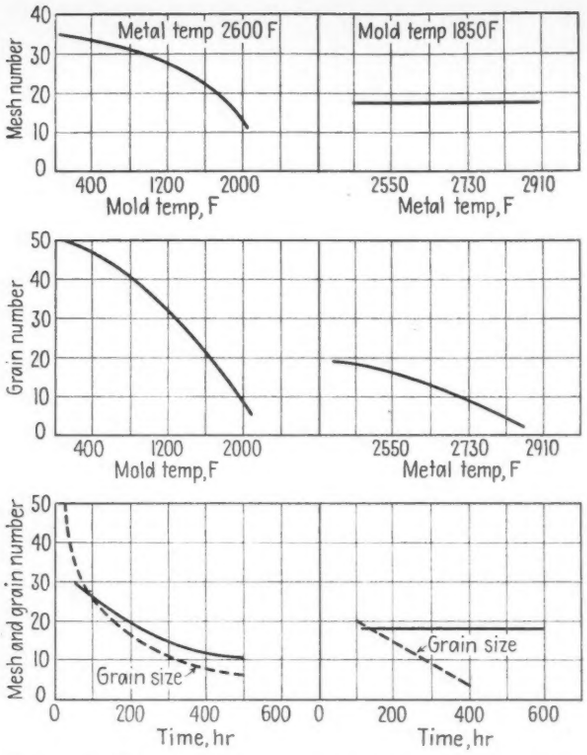


FIG. 13—Effect of mold temperature and metal temperature on mesh number, grain size, and rupture life at 1500°F under stress of 30,000 psi of high-carbon cobalt-base alloy.

Studies are being made of the relationship existing between mold temperature, metal temperature, grain size, ductility, and carbide mesh spacing, but as yet it is too early to say exactly what may be expected. Grain size refers to the actual number of grains discernible on a polished and etched cross-section of a ¼ in. test bar and at a magnification of 400X in an 0.04 in. gage length. Tests on special high-carbon, cobalt-base type alloys, indicate that metal temperature and mold temperature affect grain size and carbide mesh spacing in a significant manner, the former affecting the rupture life and ductility of the metal. Carbide mesh spacing governs the ductility of the metal, but the relationship of mesh spacing to ductility is not directly proportional to the change in mesh spacing. Carbide mesh spacing is increased by raising the mold temperature, but is not altered by changing the metal temperature. Grain size enlargement occurs with increasing mold or metal temperature, other factors being the same. Rupture time increases with grain coarsening in a uniform, although nonlinear manner. A summary of these variables is shown in fig. 13.[11]

These relations have not worked out as conclusively for the lower carbon, cobalt-base alloys, but the work has not proceeded far enough to predict its outcome. Perhaps the problem has been simplified to the extent that insufficient variables are being considered. The value to be gained from these correlations will lie in the ability to control consistently the performance of castings.

[11] *N. J. Grant, "Materials for Gas Turbines Operating at 1500°F, Test B-3254," Research Memo No. 2-45, Bureau of Ships.*

Since all gas turbines are subject to fluctuating stresses, information on the fatigue endurance properties at elevated temperatures is needed. Unfortunately, such tests are difficult to conduct. The principal difficulties are; (1) lack of trouble-free equipment for measuring this property, and (2) the length of time required to establish an endurance limit. The Westinghouse Electric Co. has developed a machine which vibrates the end of a fixed cantilever through a constant distance by electronic means. The results of some of the work with this machine are shown in table XIII.[5] It is seen that wrought alloys tend to exhibit higher fatigue endurance stresses than cast alloys, and that in all cases the endurance values exceed the stress-rupture values for 1000 hr life.

The ability of a material to dampen out stresses is also important. Damping capacity of a metal is the ability of the metal to absorb energy through internal molecular friction; in other words, to cease vibrating. Alternate pulsations tend to build up vibrating stresses exceeding the design stresses which the material must absorb. Inability to do so may result in premature failure of the metal. Unfortunately, none of the recently developed high-temperature alloys have good damping characteristics at elevated temperatures. The poor damping characteristics are undoubtedly due to their high strength at elevated temperatures. The damping problem is closely associated with high-temperature fatigue, and reliable test data are badly needed.

The desire to weld the alloys has introduced a serious problem which to date has only been partially solved. The welding difficulties noted have been three in kind. They are, in the order of their importance, notch extension, weld metal bead cracking, and heat-affected-zone cracking. Notch extension is a form of cracking, initiated at the junction between buckets,

TABLE XI

Hot-Working Data in Connection with Figs. 11 and 12

Ingot Size—3-in. sq. Final Billet Size—1-in. sq.

Curve Number	Number of Heatings to Initial Forging Temperature	Initial Forging Temperature, °F	Percent Reduction For Each Heating						Finishing Temperature After Final Heating, °F [1]	Time to Fracture at 1500 °F under 8000 Psi Stress
			1st	2nd	3rd	4th	5th	6th		
1	4	1975–2075	30	36	43	55	..	..	1300	239
2[2]	3	1975–2075	55	43	55	..	..	..	1375–1550	490
3	5	1975–2075	30	36	36	39	36	..	1475–1525	714
4	5	1975–2075	30	36	34	39	36	..	1300	760
5[3]	1	2050	86	..	..	..	..	..	1680	584
6	6	1975–2075	16	15	36	44	30	36	1600	1200[4]

[1] Finishing temperature about 1750°F for intermediate heatings.
[2] This heat was not tested in the heat-treated condition.
[3] Hot-rolled from a 2-in. square forged billet to ¾-in. square bar.
[4] Sample removed from test, total elongation about 0.6 pct.

TABLE XII

Effect of Heat Treatment on Stress-Rupture Properties Of Low Carbon N-155 Alloy

Condition of Metal	Test Temp., °F	Stress to Cause Rupture in Designated Time		
		10 hr	100 hr	1000 hr
Hot-worked	1200	72,000	58,000	48,000
Heat-treated	1200	62,000	52,000	43,000
Hot-worked	1350	48,000	36,000	27,000
Heat-treated	1350	36,000	28,000	22,000
Hot-worked	1500	30,000	20,000	13,500
Heat-treated	1500	25,000	20,000	15,000
Hot-worked	1650	16,000	7,600	3,500
Heat-treated	1650	17,000	12,000	7,000

TABLE XIII

Endurance Properties of Heat-Resisting Alloys

Alloy	Condition of Metal	Test Temp., °F	Endurance Strength For 10^8 Cycles, Psi
19-9DL	2100°F—1 hr, air-cooled, 4 hr 1200°F	1200	43,000
19-9DL	2100°F—1 hr, air-cooled, 15 pct red. at 1200°F, 4 hr, 1200°F	1500	17,000
Timkem	2100°F—water-quenched, 4 hr, 1200°F	1200	46,000
Timken	2150°F—¾ hr, water-quenched, 50 hr, 1500°F	1500	19,000
L.C. N-155	Heated 50 hr 1200°F	1200	66,000
L.C. N-155	Heated 50 hr 1200°F	1500	33,000
S-816	2350°F—1 hr, water-quenched, 90 hr, 1290°F	1200	69,000
Vitallium	As-cast	1200	44,000
Vitallium	As-cast	1500	33,000

which propagates in a radial direction across the weld joint. These extensions continue to propagate during service, hence they present a serious problem. Two forms of weld metal bead cracking have been observed. The first form is longitudinal cracking in the center of the deposited bead. The second form is sporadic intergranular cracking. Cracking due to hot-shortness in the heat-affected-zone has been observed in some of the alloys. Susceptibility to cracking in the heat-affected-zone is believed to be due to the melting of the compound in the grain boundaries or to low ductility resulting from the presence of these compounds at the grain boundaries.

As yet, insufficient work has been done to draw sound conclusions, but it may be stated that wide variations exist in the susceptibility of different heat-resisting materials to the development of welding defects.

Summary

In this discussion, the metallurgy involved in the development of heat-resisting materials for gas turbines and the like, has been examined. The metallurgy of the newer alloys, although complex, is based on the fundamental laws of creep derived from studies of the older alloys. It has been shown that the high-temperature properties of the newer alloys are critically affected by such factors as manufacture, processing and fabricating; hence careful metallurgical control of these factors, as well as careful selection of composition, must be exercised if premature failures are to be avoided. A wide variety of compositions which differs appreciably in properties is available. Their practical utility cannot be fully appraised until service experience is gained.

New Books

"Statistical Quality Control," by E. L. Grant. Gives detailed explanation of basic principles of statistical quality control techniques, plus numerous practical examples. Discusses the theory of laws of probability and illustrates use of Shewhart control chart for reducing costs of spoilage and rework. McGraw-Hill Book Company, 330 W. 42nd St., New York 18. 564 p. $5.

* * *

"Management Techniques for Foremen," by R. W. Wetherill. Information for foremen presented in question and answer form, covering both what management expects from the foreman and what the worker expects from the supervisor. Loose-leaf manual is broken down into 18 sections, each section covering a phase of a foreman's responsibilities and activities. National Foreman's Institute, Inc., Deep River, Conn. $7.50.

* * *

"Mathematical Aids for Engineers," by R. W. Dull. Discusses basic mathematical tools essential to dealing with the higher mathematics involved in modern engineering. Coverage ranges from uniform scales and hyperbolic functions through linear differential equations of the Nth order with constant coefficients. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. 246 p. $4.50.

* * *

"The Great Detective," by W. W. Stout. A discussion of the history and development of radar. Volume describes ways American-made radar units served the Allied armed forces during the war and tells of the Chrysler Corp.'s part in designing and manufacturing the antenna mount and trailer for the SCR-584 radar unit. Chrysler Corp., Detroit, 99 p.

* * *

"Standard Practices for Stationary Diesel Engines." Covers standard practices of industry with respect to diesel engine construction, selection, erection, horsepower rating, performance, testing, fueling, lubricating, speed regulation, generating equipment, cooling, etc. Diesel Engine Manufacturers Assn., 1 N. LaSalle St., Chicago 2. 154 p. $2.50.

* * *

"Hoyer-Kreuter Technological Dictionary." Covers terms used in crafts and industries, engineering, mining and metallurgy, testing, optical, safety, shipbuilding, and many other fields of engineering and commercial activity. Published in three volumes; German, English, French; English, French and German, and French, German, English. Frederick Ungar Publishing Co., 105 E. 24th St., New York 10. $50 (three vol.).

Cutting Stainless Steel With t

IN all metal fabricating operations, the job of cutting, particularly in the case of stainless steels, alloys, and nonferrous metals, is at best a difficult and costly operation. Many attempts have been made to gain a better control over this, and, step by step, progress has been made. The introduction and successful application by the Arcos Corp., Philadelphia, of its Oxyarc process for hand cutting stainless steels, alloys, nonferrous metals, cast iron, and mild steel, ranks therefore as one of the most significant developments in recent years, since it renders this normally difficult job simple and much less expensive.

The process cuts metal by means of a concentrated pinpoint of heat generated by an electric arc and a stream of oxygen. The arc is established between a coated tubular rod and the metal to be cut. The oxygen is supplied through the opening in the rod itself. This tubular rod, known as Oxycuttend, is rolled from low grade mild steel, and is consumed during the cutting operation. The seam is not welded shut, but is rendered gas tight by the application of the coating.

In operation, the Oxycuttend rod is held by a special holder, in appearance not unlike a standard welding electrode holder. The lower jaw contains a toggle-operated vise for gripping the rod, so arranged that when the jaw is snapped down, the vise opens and permits the rod stub to fall out. A fresh rod may then be inserted, and is securely held by merely closing the jaws. The upper jaw is tubular in form and serves as a passage for the oxygen. When the jaws are closed the upper end of the rod passes through a rubber washer to prevent the escape of oxygen. The flow of gas is controlled by a valve built into the holder and triggered by the operator with the hand that grasps the holder.

The other equipment required is usually found in any shop where metal fabrication is being done, namely an arc welder, and bottled oxygen with the usual regulating valves and gages. The welder may be either ac or dc, and either straight or reversed polarity may be used.

The Oxyarc process has demonstrated its unusual versatility by piercing and cutting such widely diverse materials as high chrome and chrome nickel stainless steels, nickel, cupro-nickel, monel, nickel clad, bronze, copper, brass, Everdur, aluminum, cast iron, Hastelloy, and mild and low alloy steels, in sheet, plate, or cast form. Furthermore, these materials may be stacked and cut or pierced successfully without any clamping, and the same rod is used for all materials. It is moreover, an all-position rod in that it will operate in the overhead as well as in the vertical or downhand position. It will actually pierce metal with greater ease and in substantially less time than a high speed drill. At present, the rod is made only in the 3/16-in. size,

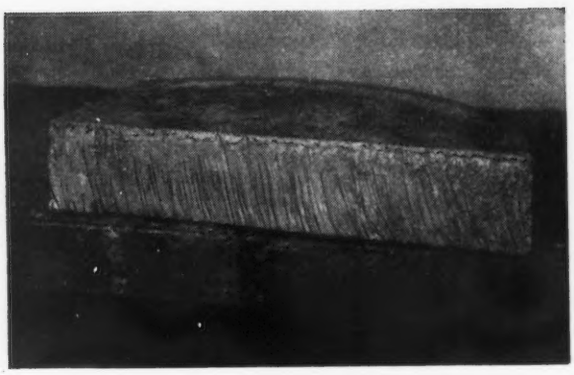


FIG. 1—Typical appearance of an Oxyarc cut made through a block of mild steel.

and it is not recommended that cutting be done on materials thicker than about 6 in. Piercing, however, has been done to a full 12 in.

This new tool should reduce layout problems to a minimum, since holes may be cut in formed pieces after forming. It is particularly applicable also to foundries, because of the ease with which it will cut risers from castings, regardless of material or shape. In gouging too, it promises to be equally effective. Other uses include the removal of rivets and the cutting of scrap, regardless of the variety of material encountered.

Particularly advantageous is the fact that no particular skill is needed to use the Oxyarc process, and the knack may be picked up in a few minutes by any welder, while even a totally unskilled worker may become adept in less than an hour. For piercing metal, the end of the rod is tapped on the work to strike the arc, and at the same time the oxygen trigger is pressed. Thereafter, the rod is simply pushed through the work, no attempt being made to hold a specific arc length. Cutting is performed in the same way, by dragging the end of the rod across the surface of the work.

Amperage and oxygen pressure should be varied for different materials and thicknesses, and range from 180 amp and 5 psi for thin stainless sheet, to 300 amp and 70 psi for thick copper. The range, however, is far from critical, and optimum settings are quickly established by experience. The minimum amperage recommended is 180 amp, but some interesting experiments have been carried out with a portable farm welding outfit having a maximum output of 150 amp. All kinds of materials were cut but, naturally, the time was somewhat increased. It would appear therefore, that an Oxyarc holder might form a very useful accessory to farm welding outfits.

The economies of the process are marked and defi-

th the Electric Arc . . .

By H. E. LINSLEY
Machine Tool Editor

Marking an important development in the cutting of stainless steel, copper, monel and other ferrous and nonferrous alloys, a new technique called Oxyarc cutting, is described herein for the first time. The process involves the use of a tubular mild steel rod through which a stream of oxygen is supplied to the arc. The operation is extremely fast, and parent metal is not contaminated.

nite. For the shop already welding and using oxygen, the only additional outlay is for the special holder. The price of the rods is sufficiently low that it results in a favorable cutting cost. Since the process develops a temperature some 3000° F hotter than the oxyacetylene process, preheating is eliminated. This is especially advantageous when making cuts of short length, wherein the preheat time with oxyacetylene may form a substantial proportion of the actual cutting time. Another economy, relatively smaller, but definite, is that oxygen is consumed only when cutting is under way. It is not used for preheating or for maintaining a flame when not cutting. Furthermore, consumption averages only 50 to 55 pct as compared with oxyacetylene cutting. Both time and material are saved by the fact that cutting may be started and stopped any number of times with the same rod until it is consumed down to a stub.

FIG. 2—Difficult to cut by any other burning method, a 1½-in. slab of Everdur is cut quickly and cleanly by the new process.

Effect on Base Metal

In many cases the Oxyarc process, when compared with any other hand-operated burning process, reduces the subsequent preparation of the cut metal edge because it allows cutting very close to the finish line. Under these circumstances, grinding to produce a perfectly smooth edge for a proper fitup, is held to a minimum. All preliminary tests indicate that the process does not contaminate the base metal. This is, of course, particularly important in the case of stainless. Available test data indicate that the heat effect on the base metal is substantially less than that encountered in arcwelding. Test pieces of Inconel and 15-35 chrome nickel alloy show a maximum heat affected zone of 0.030 in., with no carbide precipitation

FIG. 3—At the start of a piercing operation sparks fly upward, but subside as soon as the end of the rod is below the surface.

and a maximum of 0.006 in. of contaminated metal. The reason why the mild steel rod does not cause contamination of the base metal adjacent to the cut is said to be that the extremely high heat and the oxygen under pressure combine to oxidize the rod and coating at the point of the arc before it can fuse into the parent metal. The purpose of the coating is to help maintain arc stability, and to form a small crucible which directs and confines the arc, thus giving better control over the cutting. In addition, the coating acts as an insulator to prevent the striking of an arc at an undesired point on the rod, and during cutting provides an insulated heel on which the rod can be dragged along the line of cut.

Warpage in thin sections is negligible because the heat is applied only momentarily to an area hardly greater than the cross section of the rod. Chipping, grinding, drilling, or machining operations on Oxyarc cut materials are said to be less difficult than if performed on material cut by any other burning method, as no surface hardening is experienced. All appearances indicate that in comparison with other hand cutting processes, this new method reduces the time required, over and above other good shop practices, to prepare edges for further fabrication.

In the fabrication of complicated shapes, if holes for flange connections, manholes, or any other shape of connection can be cut after forming, much time, particularly in layout, can be saved. The portability, piercing and cutting qualities of the Oxycuttend rod in any position makes it possible to effect this saving.

In one particular case it was required to cut four holes in the side of a stainless steel tower 5 ft diam and fabricated from type 304 stainless. Two of these were 4-in. diam, and two were 2½-in. diam. In regular production these were chipped out with a hand chisel by 3 men working 8 hr, or a total of 24 man-hr. Using the Oxyarc process, the entire job was done by 1 man in 15 min. In another instance a 25-in. diam manhole was cut in a tower made from type 304 stainless steel varying in thickness from ¼ to 7/16 in. The operation took 40 min at a total cost for labor, rods, and gas of $5.00. The same job done by the old method would have consumed some 48 man-hr, and cost approximately $240.00.

Not all savings, however, are quite as obvious as this, and in computing cutting costs several factors may have to be taken into consideration. For example, in one foundry it was found that Oxyarc cutting of large risers required 6 min, against 1½ min with an abrasive wheel. Investigation, however, disclosed that the wheels lasted for only three cuts, thus bringing the cost to almost $10.00 per cut, whereas arc cutting cost less than $1.00.

FIG. 4—Cutting Type 304 stainless up to 3-in. thick may be done without causing carbide precipitation or contamination of the parent metal.

Other operations successfully performed include cutting mild steel plate backed up by asbestos insulation, as in ship repairs, without injuring the asbestos; gouging out old weld metal to separate a plate welded longitudinally to a 12 in. pipe, without damaging the pipe; cutting out rusted bolts and rivets to salvage machinery parts; and cutting off the worn points of manganese bucket teeth.

Of particular interest from the operator's point of view is the fact that no undue amount of heat is generated, and cutting can be carried in continuously without discomfort. This factor may also be of practical value, as in the case where it was desired to cut a 4-in. diam. drain hole in an already fabricated 18-8 stainless brine tank. Directly behind this hole was a rubber conveyor belt. A 1¼-in. block of asbestos was placed between the belt and the work, and a short length of pipe, with an ID equal to that of the hole to be cut, was tackwelded into position. Using the inside circumference of the pipe as a template, the operator cut the hole in 90 sec through the 3/16-in. stainless plate with no damage to the rubber belt.

▼ ▼ ▼

New Equipment . . .

Material Handling

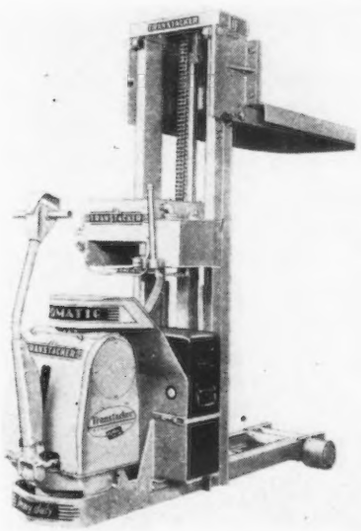
Recent developments in industrial lift, tiering and fork trucks, gantry and hydraulic cranes, conveying equipment and rotary tables are described in this week's review.

EQUIPPED with electric drive and lift, and called the Powerox, a lift truck has been announced by the *Barrett-Cravens Co.*, 3255 W. 30th St., Chicago 23, which will handle loads of 4000 and

6000 lb with comparative ease, it is said. An automatic automotive type brake stops the truck, with handle in either vertical or horizontal position. Finger tip control with two speeds forward and two speeds reverse, and raising and lowering of load carrying platform are accomplished by push button operation at any handle position. Full 4-ft vertical lift is reached in 4 sec. The Powerox is powered by a 1-hp heavy duty motor, completely enclosed. Trucks are available in 6, 7, 9 and 11-ft height, all with a full 4-ft lift.

Tiering and Clamp Trucks

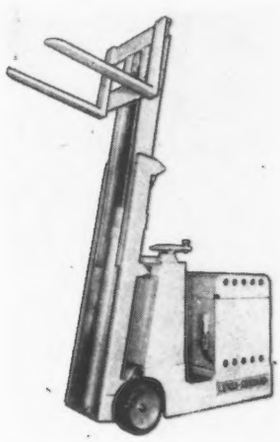
THE motorized hand truck counterpart of fork lift and high-lift platform trucks is the Transtacker, announced by the *Automatic Transportation Co.*, 149 West 87th St., Chicago 20. It is a battery-powered high-lift tiering unit which serves where weight, size, speed or cost make the larger units impractical. Designed in four models for all types of pallets and skid platforms, the Transtacker illustrated, handles vertical tiering of unit loads in production and storage facilities where floor or elevator capacities are limited, where extreme maneuverability is essential, and where volume of material or other conditions do not require standard platform or fork trucks. Load capacities range from 2500 to 4000 lb and platform and forks rise to heights of 68 and 64



in. respectively. Lift mechanism features a hydraulic system and oversized pump and motor. The Transtacker operates with automatic finger-tip-control; two buttons on the guide handle control forward and reverse power, while a third operates the lift. Horizontal speed and the dead-man-control brake are controlled by vertical position of the guide handle. An industrial truck that will handle light and bulky cartons as unit loads without pallet or skid also has been announced by the company. It is a modified version of a standard fork truck and operates with hydraulic clamps replacing the regular forks, eliminating the need for pallets in tiering, detiering and hauling operations.

Fork Truck

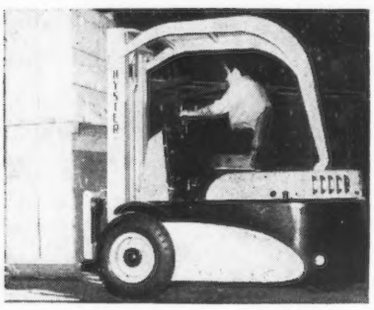
CONSERVATION of aisle width and consequent increase of available storage or production space are claimed for the 4000-lb capacity electric power fork truck, manufactured by *Lewis-Shepard Products Inc.*, 222 Walnut St., Watertown 72, Mass. Using a 48-in. fork and carrying a 48-in. load, this truck will enter an aisle 12 ft wide and, in one continuous forward travel of the truck, make a single right angle turn and right angle stack, with no backing or filling. Three features of limited overall length, short turning



radius, and low center of gravity provide maximum maneuverability under all conditions.

4000-Lb Lift Truck

ADDED to the line of materials handling trucks produced by the *Hyster Co.*, Portland 8, Oreg., is a pneumatic tire 4000-lb fork type lift truck, termed the Hyster 40.



Using a Wisconsin air-cooled motor, trunnion steering and 7.00 x 12 pneumatic tires the truck is adapted for use over any type of indoor or outdoor road surfaces.

Apron Feeder

FOR conveying heavy, sharp, abrasive rock and similar materials for which a belt conveyor is impractical, the *Pioneer Engineering Works, Inc.*, Minneapolis 13, has announced a portable apron feeder. This long feeder, mounted on its own chassis and wheels, with hopper attached, can be swung into place quickly for short-time setups. The feeder, now made in the 36-in. width and measuring 30 ft from center to center of head and tail shafts, is supported on a single axle equipped with dual pneumatic tires. Steel wheels are optional. The frame is built from rolled channels, truss braced to prevent weaving and distortion under load. Feeder pans are ½-in. thick forged

steel plate, with overlapping corrugations to give added strength against impact and load and to prevent slippage of material. Drive is from the crusher to the feeder shaft through a clutch and built-in gear reduction.

Gantry Crane

PORTABILITY, ease in handling and flexibility for many varied lifting services are the features of a new gantry crane announced by the *Industrial Equipment Co.*, 315 N. Ada St., Chicago 7. Of one-ton capacity with generous safety factor and minimum gantry weight, it has a variety of uses at loading platforms and docks, in power plants, machine shops and factories.

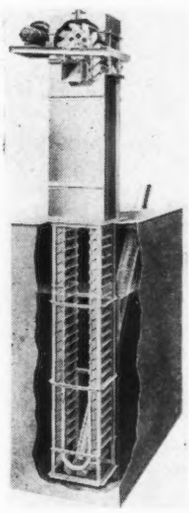
Truck Crane

DEVELOPMENT of a two-ton Hydro-crane, model H-2, has been announced by the *Milwaukee Hydraulic Corp.*, Milwaukee. The crane employs full hydraulic control for every operation, eliminating all gears, clutches, brakes and drums. A simple, high capacity hydraulic system operates the entire unit, boom, hoist, swing and the clamshell bucket. The standard tubular boom raises and lowers as well as telescopes from 16 to 22 ft under hydraulic power, enabling operator to spot loads quickly and accurately, reach into box cars, over walls, between beams or into

buildings. 360° swing is provided. Ample stability is assured by means of hydraulically powered outriggers which can be independently extended or retracted both horizontally or vertically in 3 to 5 sec. Model H-2 mounts on 1½-ton trucks or special 6 x 6 drive Jeeps.

Bucket Elevator

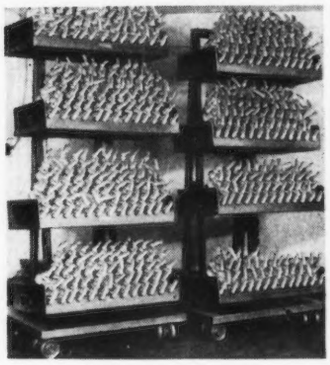
KNOWN as the Interno bucket elevator, an internally loaded, loop-type bucket elevator has been announced by the *Link-Belt Co.*, 307 N. Michigan Ave., Chicago 1, as being suited to the handling of delicate, relatively small manufactured parts through a generally upward direction. Elevating medium consists of an endless series of overlapping, inwardly-opening continuous buckets supported on a steel roller chain which is operated over sprocket wheels at top of lift, and at foot is guided by curved steel angle tracks. Buckets are open only in the back, permitting internal loading at foot from a



chute extending through the side of the steel casing which encloses the elevator. The elevator can be loaded on both sides, either by chute or conveyor extending over the bucket line at foot and can be discharged at top to either side, through a chute or directly to a conveyor. The elevator can be furnished with either one or two head shafts.

Rack Conveyors

MATERIAL handling methods involving tray and wheeled rack arrangements, which allow for the segregation and easy accessibility of parts for efficient time-saving assemblies, have been developed by *Rack Engineering Co.*, Pittsburgh. The rack-conveyors, of all steel construction, permit easy pickup, speedy transportation over long distances, and full maneuverability when placed at operational sites. The conveyor's uprights are fully serrated thus



permitting variation of spacing between the trays. The swivel arrangement of the unit's roller bearing type wheels affords easy maneuvering of the unit when fully loaded. Since master trays are not handled manuallly when loaded, they can be loaded to capacity. Rack-conveyors range from light to heavy duty models.

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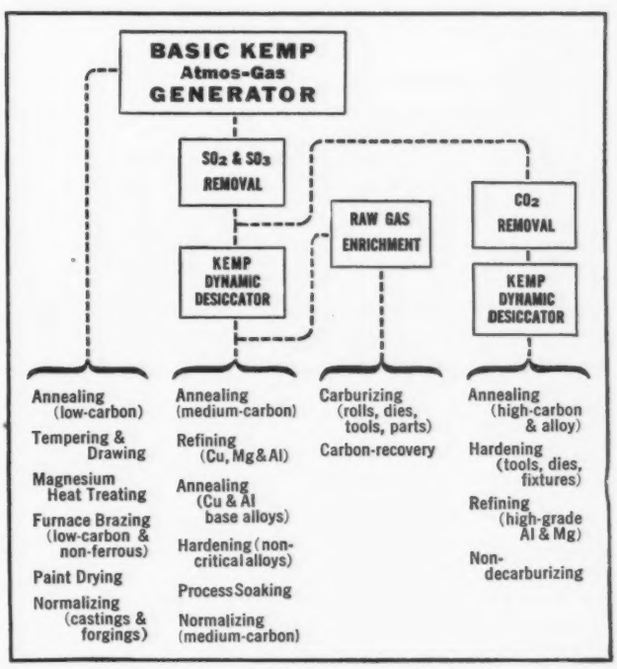

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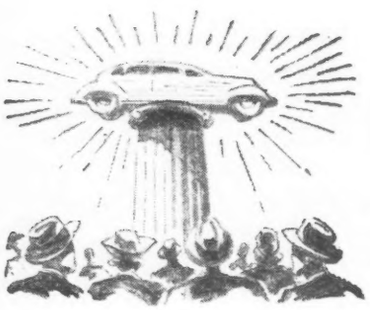
WALTER G. PATTON

• Inventories of auto producers reach all-time high . . . Labor trouble at Ford stalemated, but issues may be settled without a stoppage.



DETROIT — It is an oversimplification, of course, to say that the automobile industry traditionally operates without warehouses. It is true, however, that the automobile industry *aims* to operate with as few warehouses as possible. In normal times, every effort is made by auto producers to hold inventories at a bare minimum, and this has been one of the basic reasons why automobiles have always been built at comparatively low cost.

It is interesting, therefore, to note how the uncertain conditions existing today and operating cutbacks have influenced the inventories of major automobile producers. For example, in a recent letter to Chrysler stockholders, K. T. Keller, president of the company, pointed out that the net inventory of Chrysler Corp. as of Sept. 30, 1946, was $101,796,692. This is an all-time high in the corporation's history, he said.

Similarly, inventories of General Motors as of Sept. 30, 1946, amounted to $549,356,483 compared with $348,080,639 at Dec. 31, 1945, and only $321,973,730 on Sept. 30, 1945. Thus GM inventories have increased 70 pct during the past year.

If Ford figures were available they would undoubtedly exhibit a similar trend.

Commenting on the Chrysler inventory, Mr. Keller said: "It reflects not only higher material costs, but an unbalance brought about by the fact that some materials were available, delivered and accepted before the impossibility of procuring others made it necessary to cut schedules."

Some auto producers have found it necessary to reduce their projected schedules as many as a dozen times since VJ-Day. The inevitable consequence of these downward revisions is badly balanced inventories.

MR. KELLER said he did not look for any improvement in the situation in the near future since current operating schedules are substantially lower than the number of cars that could be built if the company were able to obtain materials. "The immediate difficulty arises from the shortage of materials," he said, "of which the flat steel situation is typical and most outstandingly important."

One encouraging factor about automobile inventories is that a relatively few items usually account for the bulk of the total. In normal times, investments in inventory normally melt away quickly where capacity production can be maintained for even a few consecutive months.

Although the Ford openhearth department is again in operation a solution to the labor problem which has developed as a result of the use of sodium fluoride has not been found. Ford has agreed to take the following steps:

(1) Submit the problem to umpire Dr. Harry Shulman under the terms of the company's contract with the union.

(2) Meet with the representatives of Local 600 and Richard T. Leonard national UAW Ford director to adjust differences between the company and the union.

THE Ford position is that the union is guilty of a contract violation inasmuch as the health hazard issue was not presented in writing and negotiations were not conducted over a 15-day period as provided under the contract. The health problem and the contract violation, Ford insists, are separate issues.

Meanwhile, Local 600 UAW-CIO has filed a formal strike notice and continues to hold that Ford failed to follow a proper procedure before taking disciplinary action against 18 cranemen and steel workers involved in the dispute, and that Ford has not the sole right to determine when a health hazard exists. Plans for a strike vote have been set for Nov. 17.

Ford has declared that the report of the State Dept. of Labor and Industry showed there was only a minor health hazard involved in the use of sodium fluoride in the openhearths. The company has refrained from using the chemical except for test purposes since the strike occurred.

Under the new terms of the Ford contract, the umpire is not authorized to rule on the use of sodium fluoride or health hazards, although he is qualified under the contract to modify, if he sees fit, the penalties against the disciplined workers.

In view of the fact that the issue can be turned over to the umpire this will undoubtedly be done and sources close to the picture are predicting that the issue will be settled without a work stoppage, a result which both sides appear to want.

UNLESS present signs fail, Detroit is going to hear a great deal during the next few weeks about the payment of overtime pay and damages to foremen.

Several weeks ago, Continental Motors Corp. agreed to pay $355,000 in overtime pay and damages to 400 foremen who claimed they were improperly classified as supervisors. This week suits were filed to recover $6 million in allegedly unpaid overtime wages by 400 present and former employees of Hudson Motor Car Co. and Westinghouse Electric Co. operators during the war of the naval ordnance plant at Centerline, Mich.

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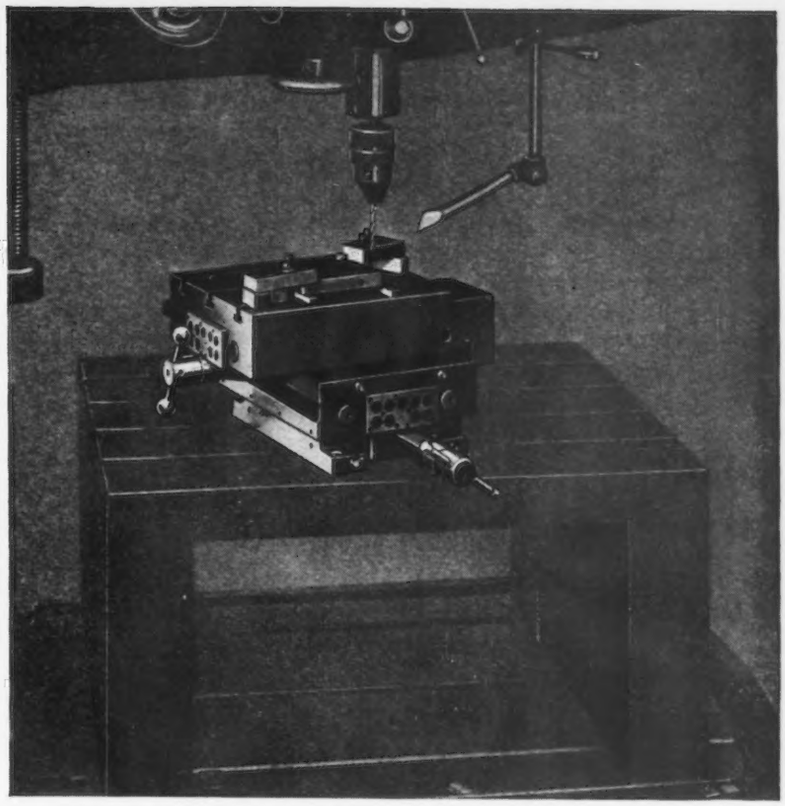

The new 4″x 4″ Bullard MAN-AU-TROL Spacer for speedily and accurately locating holes within a 4″x 4″ area . . . for use on smaller sensitive drills but usable on larger drills as shown. Its hydraulic unit will operate four 4″x 4″ Spacers if you so desire.

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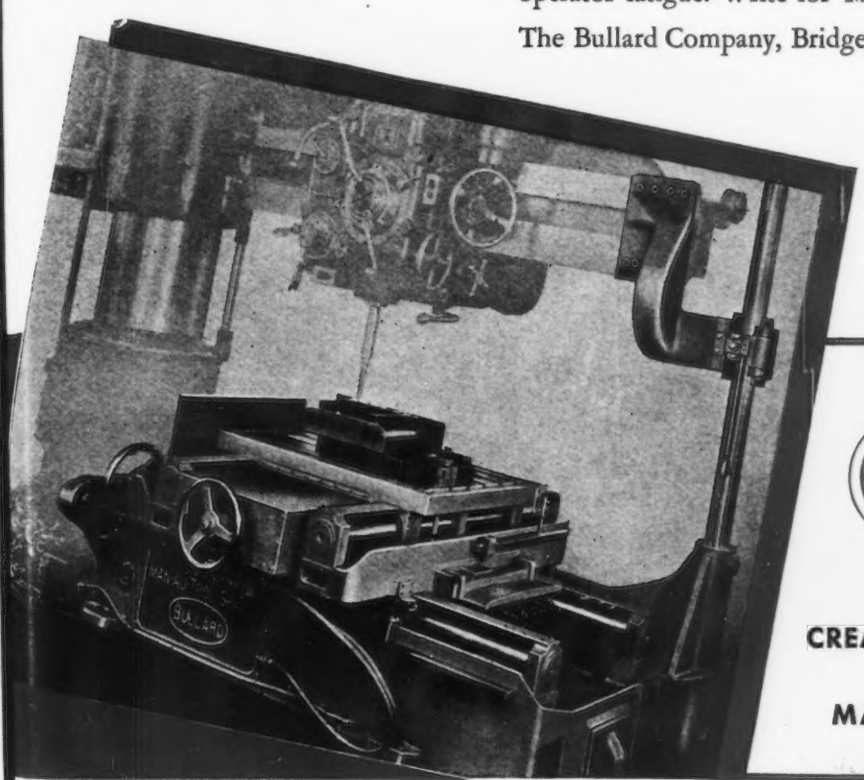
BOTH the 4″x 4″ and 30″x 20″ Bullard MAN-AU-TROL Spacers give you such benefits as: elimination of expensive jigs . . . no production tie-ups for making jigs . . . straight holes 90° to the work . . . prevention of strain on drill spindle and reduction of drill wear because of perfect tool centering . . . less operator fatigue. Write for MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Connecticut.



Typical Installation of 30″x 20″ MAN-AU-TROL Spacer.

BULLARD

CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

The suit against Hudson asks $3 million, one-half of the amount for overtime and one-half for damages from November 1941 to October 1943. A similar suit has been filed against Westinghouse covering the period from November 1943 to February 1946.

The suits have been filed in federal court under the Fair Labor Standards Act and under an executive order which provides that the seventh consecutive day of work shall be paid at double the normal rate.

Attorneys filing the suits have charged that the employees although classified as supervisory employees had no authority to hire and fire, no discretionary powers and that they worked as common employees for more than 20 pct of the time spent in the plant.

IF the employees were properly classified as supervisory employees the plaintiffs are not entitled to overtime compensation.

In addition to the Continental Motors, Hudson and Westinghouse cases, a similar suit has been filed on behalf of 36 employees of Republic Aircraft Products to recover $200,000 in damages and overtime pay. It is reported that 600 foremen in other Detroit plants will file similar suits within the next two weeks.

Those who are speculating about the possible effects of the recent election on the automotive labor situation and the industry as a whole may wish to have their attention called to a letter recently sent by K. T. Keller to Chrysler stockholders. Mr. Keller pointed out that there seems to be widespread discontent in this country on the part of workers about wages, by customers about prices, and by investors about their prospects for the profitable operation of their properties. It is quite obvious, he said, that all are suf ing to some degree from the locations that characterize post periods. The solution and the t to achieve it, will be profoundly fluenced, he said, by the appro to its problems which this cou adopts.

It can be depended on that UAW-CIO and other labor orga zations will resist with all th power, any efforts to restrict th field of action.

Fine Steel Wires To Aid Heavy-Duty Tire Users Get More Miles

Cleveland

• • • **Steel wire .0059** in. in diam is going to help American heavy-duty tire users get additional puncture-free miles from their casings in the future. The new steel strands are being produced by the American Steel Wire Co., U. S. Steel subsidiary, to form the plies or layers of material which are saturated with rubber and form the inner core or body of the tire. Used extensively in heavy-duty tires during the war, the product proved to be of great value in providing longer life for casings and conserving critical rubber.

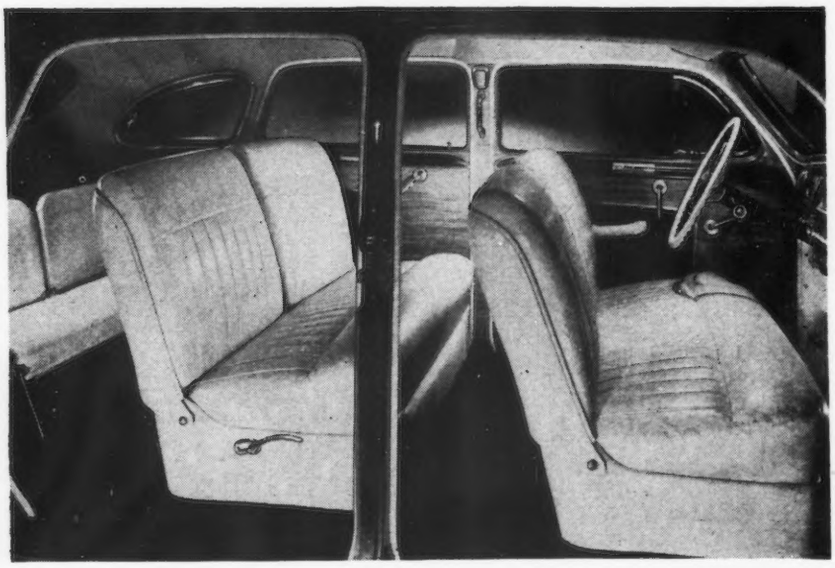
Three fine wires are twisted i a strand; six of these strands laid around a central core to fo a cord 1/32 in. in diam. A nu ber of cords are then placed p allel to each other and coated w rubber, producing a ply of extre strength and resistance for use tire construction. When three four of these plies are laid, w the wires in each running at angle to the wires in the oth plies, a strong, flexible foundati is afforded for application of t tread rubber.

Four metallic plies are equiv lent in strength and durability approximately 20 fabric plies co monly used in heavy-duty tir Although more rubber is nec sary for one metallic ply than needed to saturate one fabric p the overall savings in rubber a of important proportions. At t same time, the metal sheath th formed is highly resistant to pu tures, bruises and blow-outs a the thinner structure provi greater resiliency and eliminat the creation of a large amount heat, which is so destructive rubber. The metal core ply a eliminates casing stretch, whi results in lowering of the dens of the rubber and contributes excessive wear.

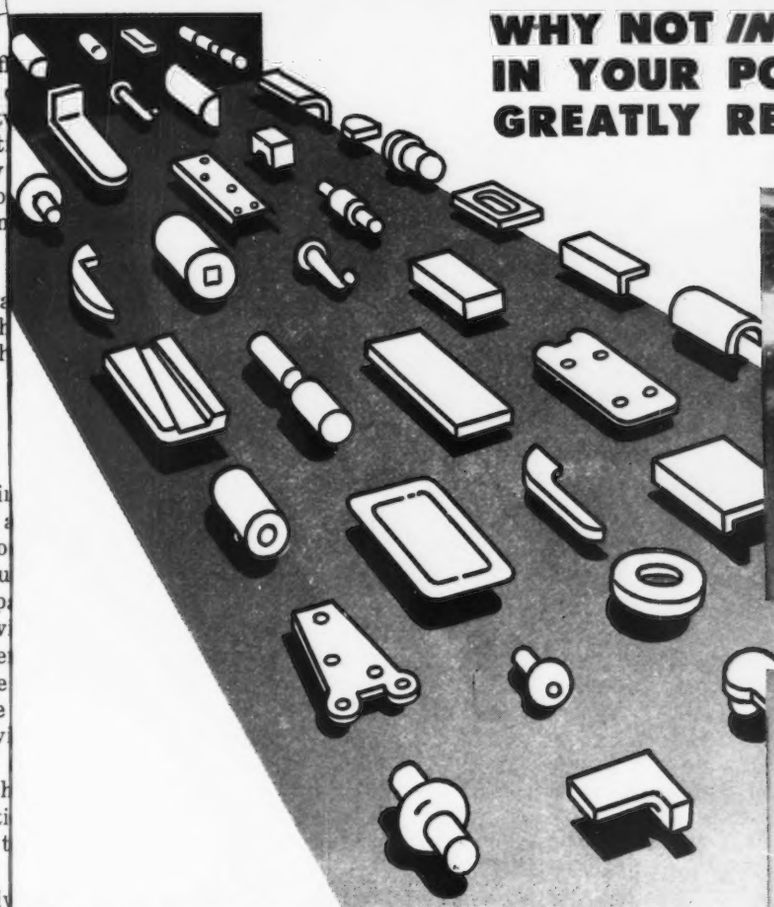
Due to the wrenching and be ing to which the cords are su jected, the wire used in their pr duction must be of an extreme high grade with tensile strengt ranging from 325,000 to 400,0 psi.

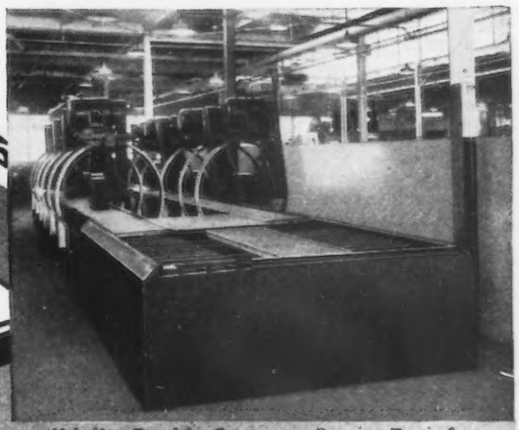
This product lends itself to number of other uses such as inforcement for V-belts, pow transmission belts and convey belts, where strength and endu ance must be combined with high degree of flexibility.

NEW DE SOTO: *This long-body De Soto features three seats, covered in Delon, a new development in plastics. Front and center seats are fully adjustable and the rear seat has three positions to permit flexible interior arrangements and accommodate up to nine passengers.*

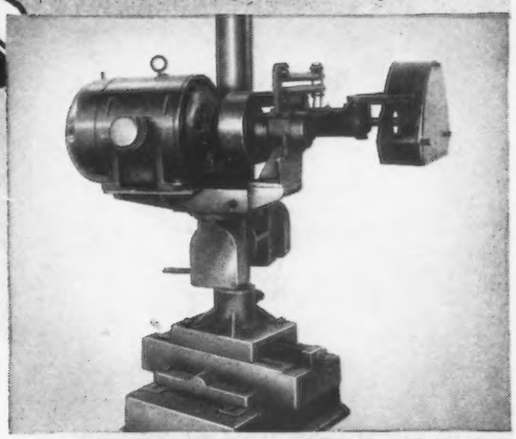


WHY NOT *INCREASE* PRODUCTION IN YOUR POLISHING ROOM AND GREATLY REDUCE YOUR COSTS?

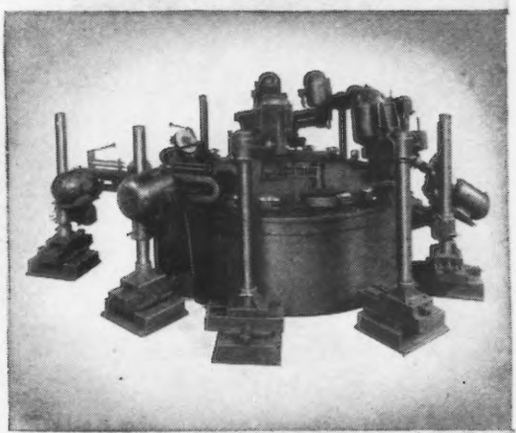




Udylite Double Conveyor Square Transfer Machine polishes parts both ways.



Pedestal Type Polishing Head which is adjustable in all directions.



Udylite Rotary Polishing Machine equipped with indexing mechanism.

Whether you are polishing auto door handles, watch cases, toaster bodies, or something else a Udylite Polishing Machine with one operator will give you more production in less floor space than a number of lathes each with its own operator.

Not only that but each piece will be polished evenly over all surfaces and every piece will look like every other piece because they are all presented to the wheels in the same manner.

Thus Udylite Polishing Machines permit you to economize on floor space, machinery, machine maintenance and man power—also to do higher quality work with operators who need not be as highly skilled as lathe hands.

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Washington . . .

L. W. MOFFETT

• ANMB working on broad industrial mobilization plan . . . Proposal for underground plants meets industry objection as disruptive of output and too costly.

WASHINGTON—Determined to bring the United States up to the highest possible state of preparedness in the event of another emergency, the Army and Navy Munitions Board has already laid the groundwork for a comprehensive plan of industrial mobilization, stockpiling, joint procurement, and coordination of import and export policy with military needs.

Working quietly and with little fanfare, the Board has progressed rapidly toward its goal. Little publicity attends its work. It was brought into the limelight recently when President Truman directed Board Chairman Richard R. Deupree to assume responsibility for coordinated Army-Navy procurement, but most of its work is unheralded. Mr. Deupree is president of the well-known soap manufacturers, Procter & Gamble.

In addition to its civilian chairman, the Board has two other members, the Under Secretary of War and the Assistant Secretary of the Navy. Below this high echelon group is an executive committee charged with administering the organizational and operational functions of the Board. The executive committee is assisted by a staff of about 50 Army and Navy officers and civil service employees drawn from the two departments. In policy matters, the Board is advised by a committee made up of the highest ranking Army and Navy staff officers.

WHILE the Board is by no means a new organization, its work is proceeding more rapidly at the present time than was possible after World War I. This accelerated progress is due primarily to the better data available and the present psychological attitude of the country.

Actually, the Board was first established in 1922. It came up with its first written plan in 1929. This was completely revised three times before 1939 when the so-called Johnson plan was evolved and widely recognized.

Headed by a civilian, the Board's present endeavors have naturally tended toward achieving the utmost cooperation between government and industry. In fact, some of its most concrete work has been in the field of industrial mobilization.

A skeleton outline of a complete industrialization plan has been drawn up, based on the pattern of the plans used in the two World Wars. However, the various portions of this plan are generalized enough so that phases may be withdrawn and rewritten from time to time so as to be kept current with the international situation, the development of a firm national policy in foreign affairs, and the implications of atomic warfare as they become more clear.

IMPRESSED with the wartime success of WPB, the Board has designated this type of agency as the cornerstone of any industrial program which might be needed in the event of another emergency. A group of civilians is being created from those who had experience with WPB to develop a manual which will embody the organizational changes in the WPB structure considered necessary as the result of actual experience with the one which was developed in the midst of the last war. This group will also make recommendations on a complete pattern for the war agencies which they feel will be necessary to be brought into being with the outbreak of war.

The Board has also reconciled and formalized Army and Navy action on about 3000 war plants in which the two services are directly or indirectly interested. It has already cleared over 2000 of these plants to WAA for disposal. This work is coordinated with that of Donald Nelson, who is conducting an independent study of stand-by plants for the President.

Also completed is a pattern of all the interagency, service and civilian industry advisory committees the Board considers necessary to cover its industrial mobilization responsibilities. Included are about 75 committees covering the industrial field and under them will be created numerous sub-committees to handle specific detail and technical assignments.

A CLOSE relationship has been established with the Army Ordnance Assn., the Aircraft Industries Assn., and the Navy Industrial Assn. These associations are now working with the Board to determine from industry what raw materials, basic materials, component parts and end items were bottlenecks during World War II so that these difficulties may be readily handled in the event of another emergency.

With so much of the groundwork already laid and with better statistical data available on the requirements of total war, the Board expects to come up with a factual, written plan of industrial mobilization sometime next year. Obviously, this plan will be subject to continuous review and revision.

For instance, in view of atomic developments, such a plan must include protection of production centers from both effects and after-effects of possible atom bomb attacks. Under consideration by the Board is the feasibility of dispersing key industries and perhaps moving them underground.

INDUSTRIAL leaders, however, are largely opposed to both dispersal and removal to subterranean sites. Present trends are for industry and labor to concentrate in areas close to sources of supply of raw materials. Not only would such a plan disrupt production, industry points out, but would involve a cost

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which industry is unable to underwrite and would have to be borne to a large extent by the government. Industry feels that a better answer lies in intensifying research and development of radar and guided missiles to detect and repel invaders before they are close enough to attack.

The Board also bears the responsibility of administering the stockpiling bill. Stockpile objectives have been set up and the Board has directed the purchase of the first year's supply after clearance with various government agencies. A supplemental list of items for additional purchase is being prepared for submission to Congress. Industry is also being consulted for its views on stockpiling.

Joint procurement is under way as indicated by the recent Presidential directive. However, this step marks only the beginning of this phase of the work which made considerable headway during the last war in such lines as medical and surgical supplies, food, lumber, textiles and clothing, footwear and some automotive items.

Mr. Dupree, in discussing this matter recently said "Coordinated buying is not an end in itself—it is a means to the end of effective and economical purchase. If it does not accomplish effective and economical purchase, it is of no value from the point of view of the armed services. Likewise, if it is adapted to peacetime conditions only, we should not make use of it without assurance that it is readily convertible to the probable needs of war."

Included in this part of the program are the following steps: Standardization of end products and components; similar procedures and policies in contracting, pricing, product inspection and cost inspection; identical timing in the purchase of large requirements of similar items; and simultaneous stock review throughout the services.

The last part of the overall plan—determination of the military interest in import and export—has only recently been delegated to the Board. However, the Board already holds membership on interagency State Dept. committees which are concerned with different phases of economic foreign policy and its members have been active in the steps being taken to conserve our national resources.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WHY, I THOUGHT MEN LIKED THEIR WIVES TO BE EXTRA NICE TO THEIR BOSS!
YES, BUT HE JUST MADE ME A FOREMAN! YE GODS, DON'T START WORKIN' ON HIM FOR GENERAL MANAGER TH' NEXT DAY-- LET ME WORK FOR A LITTLE OF TH' PROMOTIONS-- I DON'T THINK YOU KNEW THAT ANYBODY ELSE WAS HERE BUT HIM!
11-15
T. M. REG. U. S. PAT. OFF. COPR. 1946 BY NEA SERVICE, INC.
THE "SHOP LIFTER"
J.R.WILLIAMS

Concrete Bar Exports Exceed Prewar Rates

Washington

• • • **Exports of concrete** reinforcing bars, which like merchant bars, are under export control, during the 5 months' period amounted to almost 24 pct of production as compared with less than 5 pct of production in 1939, according to an article by Ely M. Artenberg in the November issue of *Domestic Commerce*. Exports of cast iron soil pipe, also under export control in the first 6 months of 1946 amounted to less than 1 pct of production.

Exports of merchant steel bars for the first five months of 1946 amounted to about 6 pct of production, a rate greater than in 1939, the article stated. It is doubtful, Mr. Artenberg said, whether these exports seriously affected the domestic housing program since merchant bars are not much used in housing.

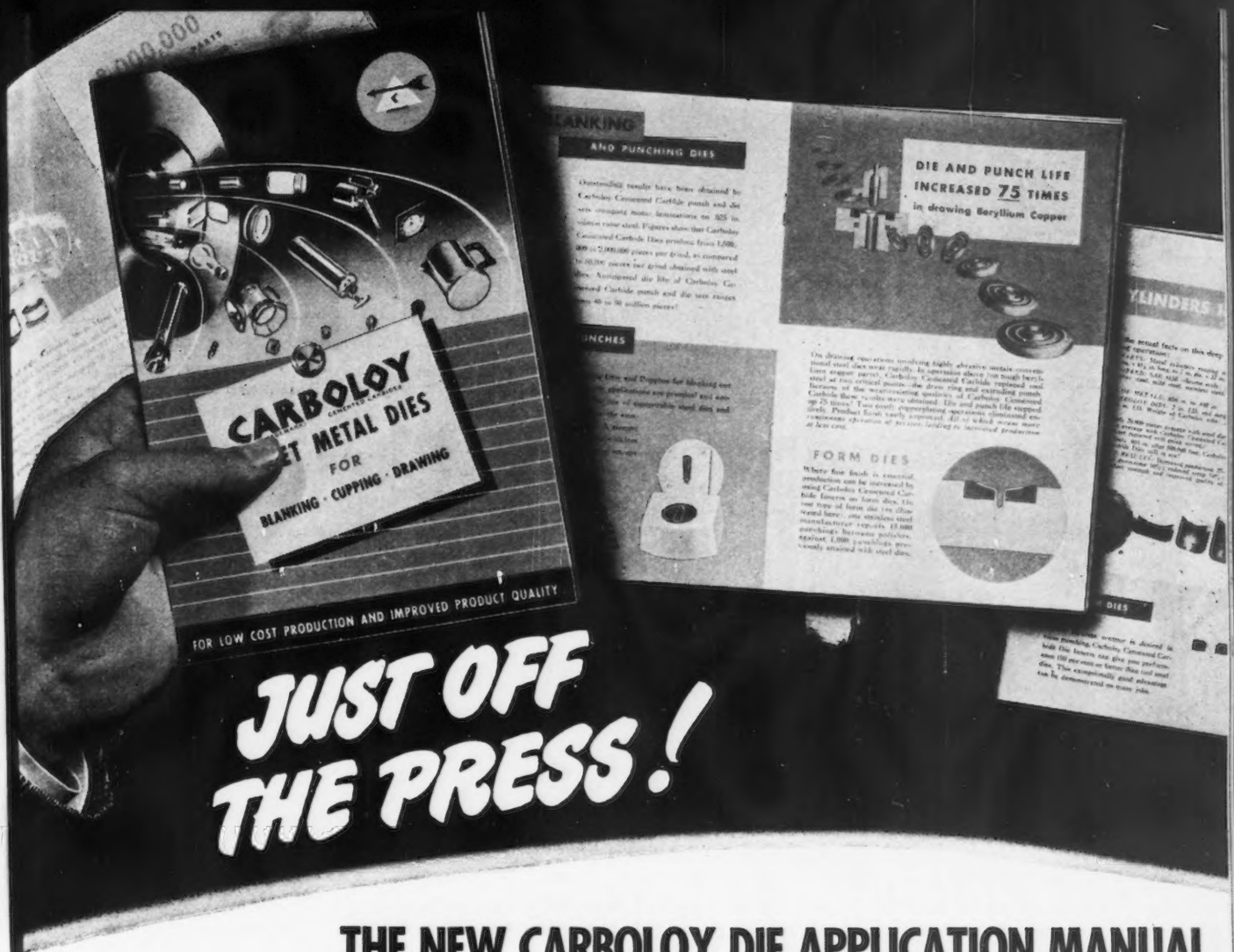
The article deals with exports of building materials. It stated that these shipments, amounting to less than 2 pct of production, are not hampering the housing program since they consist for the most part of material in types, sizes or grades not usable for home building in this country.

NHA Adds 16 Items To Premium Payment Plan

Washington

• • • **Further extending its** growing subsidy plan, NHA has set up a scale of premium payments for nail kegs, staves and headings, retroactive to Nov. 1. This brings to 16 the number of premium payment plans instituted by NHA.

Under the overall plan on kegs, staves and headings, the following premiums will be paid: 4¢ for each nail keg produced above quota; keg headings, 1½¢ for each set of keg heads produced above keg heading quota; 40¢ for each bundle of staves imported from Canada; and—for closed stave mills (those not operating during the period Sept. 1 through Oct. 31)—20¢ for each bundle of staves produced, plus 20¢ additional for each bundle produced above 2400 bundles per month, multiplied by the number of closed stave mills owned by the company.



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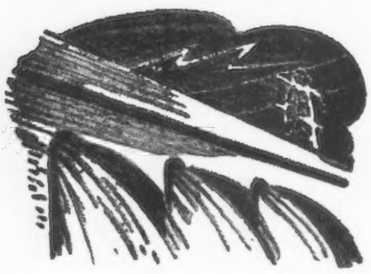
ROBERT T. REINHARDT

• California tops nation in CPA nonhousing construction permits even with keen NHA vigilance . . . U. S. must rely on atom bombs and long-range aircraft for defense.



SAN FRANCISCO — Probably every man in the steel business has heard the story of the structural steelworker who died and on approaching St. Peter at the Pearly Gates was told that unfortunately the quota for his occupation was filled and that he'd have to retire to the lower regions.

Being a persevering individual, the steelworker persuaded the guardian of the Gate to allow him in long enough to talk to some of his buddies who had preceded him. On meeting a few of his former cronies the intruder spread the story that there was one tremendous construction job going on down below and that they needed good buckers, passers and riveters. Soon heaven was devoid of structural workers who had all packed their bags and gone to a warmer climate except for the interloper. Finally he alone was left.

However, after a few days he too packed his bags and started out of the heavenly gates only to be stopped by St. Peter. "Where are you going, my friend? I thought you wanted to get into heaven and now that so many of your friends have left there is plenty of room for you."

"Well," replied the structural man, "it just occurred to me that there might really be a big job on down there and I don't want to miss it."

Perhaps the analogy is vague, but it seems appropriate to many local industrialists out here who have been reading and hearing about the steel shortage, labor trouble and other impediments to a full economic prosperity.

WHILE there undoubtedly is a shortage of critical material in this area and the industrial heaven of the East looks alluring in many respects, there are enough encouraging local signs to warrant looking into.

Recently there has been some unhappiness expressed because allegedly the National Housing Administration was putting the veto on construction programs which passed the local Civilian Production Administration office.

Investigation shows that while millions of dollars worth of proposed projects which would have utilized thousands of tons of reinforcing bars and structural steel were ultimately denied by the nationally CPA office after objections were raised by the local NHA office, this area is still second highest in the country in the granting of nonhousing construction.

In the period from Mar. 26 to Nov. 7, the local CPA office responsible for the area from Kern County north to the Oregon line has approved without objection from NHA approximately $83 million worth of nonhousing construction. Only the Los Angeles area can surpass this total according to Preston Wright of the NHA office. Chicago, New York, Detroit and Boston follow in that order after Los Angeles.

This northern California area has a weekly quota of $1,280,000 and approvals have cleared on an average for 68 pct of this maximum amount according to Mr. Wright, which means that approximately $868,000 per week has been allowed. The ratio of approvals to denials is reported at 60 pct. In Los Angeles the latest available figures showed that between Mar. 26 and Oct. 24 approvals totaled $117,000.

STRANGELY, there is no conflict between the local CPA office headed by Gilbert H. Kneiss and the NHA headed by Preston Wright. Any complaints on limitations are aimed at the laxness of NHA officials in other areas in allowing marginal construction to proceed. Both the local CPA and NHA offices appear aware of the importance of permitting a reasonable amount of industrial construction because, as one official expressed it: "What good is housing if the tenant or owner can't find a job?"

The local NHA officials point out that after all, this office can't effectively deny authorization of a construction job—all it can do is to protest it and the matter that falls into the jurisdiction of the CPA in Washington which is free to either validate the construction or sustain the objections of the local NHA office.

The CPA and NHA are solidly united on one point at least—the allotment of more steel to the West. Particular emphasis has, of course, been placed on the need for sheets and a little encouragement has been derived from the most recent exchange of telegrams between the congressional committee here and the heads of CPA and NHA.

TAKING hope from the recently announced plan of premium payments on sheets shipped to the West Coast, Wilson W. Wyatt, housing expediter, wired the local committee in part:

"In our opinion it (the premium payment) holds promise of improved shipments both to direct mill buyers and to West Coast warehouses, since a special premium is provided for increased shipments to the West Coast. If the results are not adequate this agency will press vigorously for CPA directives to be issued on eastern steel mills."

J. D. Small, CPA, gave further encouragement to local sheet users and warehousemen when he reported:

"In addition to a nationwide shortage of steel the California situation has been aggravated by higher freight costs on West Coast shipments which steel mills have been required to absorb. Recent decision of OPA will eliminate this price differential on all rail ship-

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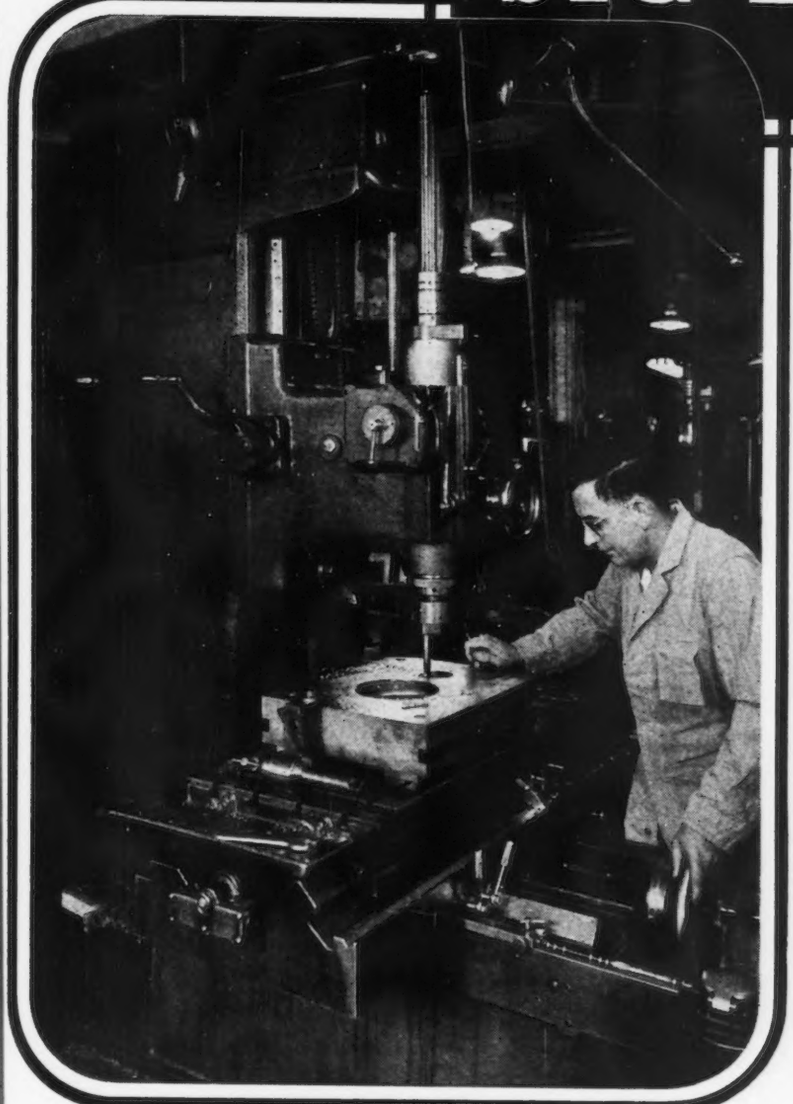

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These modern jig borers offer the accuracy of much more expensive machines at a moderate initial cost. They have the rigidity that assures continued precision — versatility to handle a wide range of close tolerance operations — ease of operation that promotes maximum production on short runs at low cost.

The machine shown is typical. Here a die boring operation is being done on a Fosdick Jig Borer at the Experimental Tool & Die Company.

Being so highly versatile it is an excellent machine for tool rooms and tool and die shops because of its adaptability to a large number of distinctly different jobs.

● **IF YOU WANT** *precision work at the most favorable cost—investigate the Fosdick Jig Borer. Consult one of our nearby representatives or write for full descriptive bulletin Fosdick Jig Borer J.B.I.*

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ments and should result in larger steel shipments to West Coast. OPA ruling now permits steel purchaser to absorb freight charges on all rail shipments made by eastern mills. I have discussed the warehouse problem with representatives of the entire steel industry and have obtained their assurance that shipments to warehouses will be maintained and not sacrificed to the needs of direct buying customers.

"We are initiating a monthly warehouse report to enable us to obtain an accurate picture of distribution through warehouses. We are also arranging to obtain reports from principal steel producers on West Coast shipments. Everything possible is being done to assure equitable distribution of steel products but it must be recognized by everyone concerned that even with equitable distribution there will not be sufficient steel to meet all demands."

WITH this encouragement as a springboard, Congressman Franck R. Havener speaking for the local committee wired John R. Steelman, director of OWMR:

"Wyatt's telegram mentions survey to be undertaken by CPA re Coast warehouse receipts and mill shipments to be used as basis for remedial action. We strongly urge that any such statistical survey show shipments by steel mill product classes rather than by total tonnage figures. Importance of this request lies in fact that critical shortage exists only in certain product classes. West Coast sources are available and ready to supply any data required along these lines."

Spokesmen for the warehousemen here were particularly anxious that any survey on shipments and needs be made on a product basis and that normal periods be used as a basis for all comparisons. These men were particularly unhappy when they learned that the NHA was preparing its directive for premiums on West Coast shipments on the basis of shipments made in the third quarter of 1946. Warehousemen point out that during that period shipments were about one-tenth of normal or even of war years.

On the other hand there are some who think that mills will be more willing to ship practically all tonnages on a premium rate, as would be the case if practically no shipments had been made during the base period, than they would to ship a heavy tonnage to equal and surpass the base shipments and thus realize their premium on only a small part of the total. For many mills which were shipping practically nothing out here in the third quarter of 1946, this premium payment will probably be very alluring.

THERE are some sources which believe that elimination of the OPA will cause some steel price adjustments to permit shipments into the area if the premium plan is put into effect on too small a basis.

LOS ANGELES — Supersonic aircraft, long-range guided missiles, and "push button warfare" will not be with us in the near future, John K. Northrop, president, Northrop Aircraft, Inc., told a group of West Coast aviation writers. Northrop emphasized that "the United States has no effective long-range guided missiles and is only in the preliminary development stage of short-range guided missiles."

The aircraft designer pointed out that although we have improved captured German V-1 and V-2 missiles, it will be from 2 to 5 yr before America will have guided missiles "worthy of the name," developed for production.

The V-1 and V-2 missiles, Northrop pointed out, could be produced in quantities today but they would be useless except for "last ditch stands" because of their limited range.

Control of guided missiles is one of the most important problems to be solved, Northrop said.

Radar control is only efficient in "line of sight" at distances up to 200 miles. Radio, which is less reliable, can operate up to 1500 miles. Heat, sound and light are being studied as control means, but at present they are unsuitable for long-range operation.

NORTHROP emphasized that even after control problems are eliminated, all the problems of transonic and supersonic flight will have to be solved.

"Sonic and supersonic speeds for aircraft are still in the future," Northrop said. "At present we do not have any aircraft capable of the speed of sound." The fastest recorded aircraft speed to date, Northrop stated, is about 620 mph, nearly 150 mph below the speed of sound.

"We have only begun to penetrate this new field of high-speed flight. We know exceedingly little about the new aerodynamic field of sonic velocities. A whole new science must be developed before we can achieve speeds of this nature," he stated.

Pointing out that top laboratories of the country have only been seriously concerned with transonic and supersonic problems for about 1 yr, Northrop stated that this nation must continue current research and development work not only on the aircraft we now have but on guided missiles and advanced types of aircraft for the future.

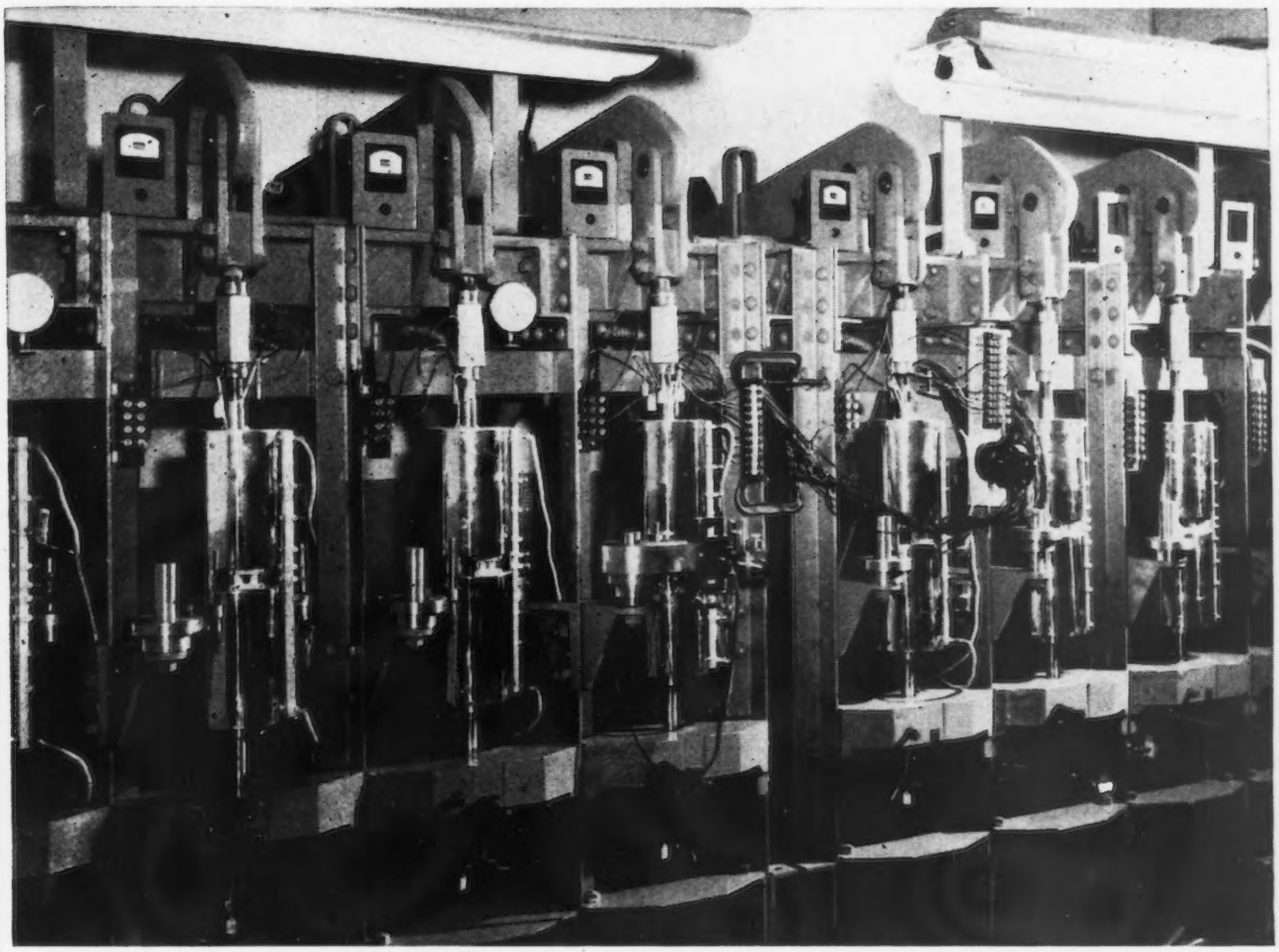
The aircraft executive believed the United States must depend on the atomic bomb and the present long-range bombers, for any war which might occur within the next 10 yr.

SALT LAKE CITY—The structural rolling mill at the Geneva steel plant, closed since May 31, 1945, resumed operations on a one shift basis last week. The company plans to move up to a two-turn operation in the near future and bring into production another of the idle openhearth furnaces. Three of the nine are now operating.

During the war the mill produced structural shapes for ships and shell steel. At present it is equipped to produce only structural shapes for commercial building but changes are contemplated in the near future to widen its range of products.

While the scrap situation here has not become acute as yet because of the few openhearths in operation and the ample pig supply from the two operating blast furnaces, appeals are being made by officials of the Columbia Steel Co. and Geneva Steel Co. for scrap recovery. Pig production of the West has been reduced by about 600 tons per day with the long-due shutdown of the Provo blast furnace. During rebuilding operations, which are expected to be completed about Nov. 20, the coke ovens are operating to supply gas to neighboring cities.

SEE IT AT THE POWER SHOW: Part of the equipment for "creep strength" tests that will be made at the National Power Show, Stainless Steels for high temperature uses are tested with this equipment



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Visitors to the National Power Show will get a preview of a remarkable new ARMCO Stainless Steel for high temperature uses.

It has some interesting possibilities for use in jet engines, gas turbines and other high temperature equipment.

Developed in the laboratories of the Rustless Iron & Steel Division of Armco, this special-purpose stainless steel has given excellent performance in laboratory tests conducted during the past two years. It not only retains great strength but also resists scaling and "creep" under extremely high temperature conditions.

Other features of The American Rolling Mill Company exhibit will be actual laboratory tests — right in the convention hall! We're moving part of our stainless steel "lab" to the Show so that you can *see* stress rupture and creep tests on stainless steels at high temperatures.

you'll be Welcome in booth 630

We'd like to get acquainted with you when you visit the National Power Show in Grand Central Palace, New York City, December 2 to 7. Just stop in at Booth No. 630. We're sure you'll want to see how stainless steels are tested for extreme high temperature requirements.

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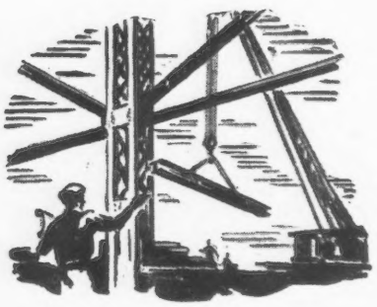
European Letter

JACK R. HIGHT

• Russians offer potent lures in efforts to get German technicians out of other occupation zones . . . Food, shelter and some academic freedom are the favorite devices . . . French steelworks begin unfolding construction plans.



AACHEN, GERMANY—Under trying conditions German scientific men are listening with hesitating minds to the blandishments of the Russian Government which would offer them contracts to work in the Russian zone of Germany, or in Russia itself. As far as life in the British zone is concerned, it is a stagnant one for a technical man, and the offer of the Russians, despite a degree of mistrust, to go back to work is a tempting one. The offers usually come from an "Engineering Personnel Service" in Berlin, and make the most generous of promises.

The Russians, with their unfailing knack for making capital of all phases of the situation offer everything that is nearly unobtainable to a German today in return for accepting a "position." One recent proposition with which I am acquainted was to a man of first-class abilities, who is relatively well off in the matter of housing in his present situation. The Russians offered him an important post in Berlin, with a 6-room apartment with all facilities furnished, rations for a heavy worker for himself and his wife, and the movement of anything that he wanted to take with him. As far as salary is concerned, the Russians offered to let him name his own rate. With the conditions so uncertain in Germany, and a total absence of consumer goods, the material sides of this offer are indeed tempting.

There is almost no hope for a German to better his housing situation at present, unless he has some specific worth to the occupation authorities, and unless he can find a new piece of cardboard that fits his window frame more tightly himself. The sight of one's family, as well as one's self, slowly wasting in health from a limited, unbalanced diet becomes more distasteful when one has had an offer which would improve the situation.

WHETHER the actual conditions as outlined would ever be followed to the letter are hard to determine. This is no particularly exclusive reflection on the Russians in this matter. In my experience, every government who has hired people to work in Germany, including their own nationals, has lied either unintentionally or deliberately in describing the conditions of work. The U. S. War Dept. by and large has a considerable number of unhappy contract workers all over Germany, because the enthusiastic recruiter painted up the joys of the job.

What is certain, and is even more tempting to high-minded technical men, is the fact that technical societies, engineering associations and related organizations are being allowed to carry on their regular meetings in the Russian zone, while in the British zone no such gatherings are allowed. It appears that the benefits of permitting them are varied. First, the technical men, many of whom no longer have the materials with which to work, regardless of where they may be located, can be in touch with those who are at work. The normal exchanges of research results, can begin in a small way to be once more accomplished, and at the same time the occupying power has easy access to those exchanges.

In the Russian zone the meetings are held, and whenever anything of interest is on the program, there are usually several Russian technicians present, notebook in hand, with all the enthusiasm and interest of any of the Germans. This interest in the work has a reverse effect of heightening the prestige of the occupying power among the Germans, and although its effect may be slight, any improvement in this direction is worth while at the present time. The bickering that has gone on amongst the Four Powers, and the inevitable ideological clashes, has done little to improve the German opinion of any of us.

THE winter is closing down chill and damp on western Germany, but I see signs that most of the civilian population is able to keep some heat in one room of the house, as well as have some fuel to cook their scanty rations. The food situation is by comparison with summer standards much improved. Particularly appreciated is the distribution daily of a supply of thick soup by the Society of Friends for all school children and teachers. The soup is good, and provides a substantial boost in the caloric value of the German diet. Wherever you move in the streets near the noon hour, you can see children carrying their huge cups steaming with the thick stuff.

The streets are beginning to see a few more of the German vehicles required to keep essential services moving. There are public service trucks, and a few important Germans in administrative posts are driving their own cars at present.

PARIS—In the course of recent discussions with French steel officials I was interested in their discussions of the costs of the family allowances plan which the French Government has set up, as well as other new social costs and their effect upon the selling price of steel. I asked one executive if he could get an estimate for me of what the tax charges were per ton of steel in France under the new plan.

Excluding income taxes, which are computed on a different basis, he tells me that his firm pays about 40 pct into various social security programs per dollar realized on a ton of steel. This 40 pct is spread over health and disability insurance, unemployment compensation, pensions, vacation pay and family allowances. In addition to the above charges the steel firms pay about 2.6 pct into the coffers of the

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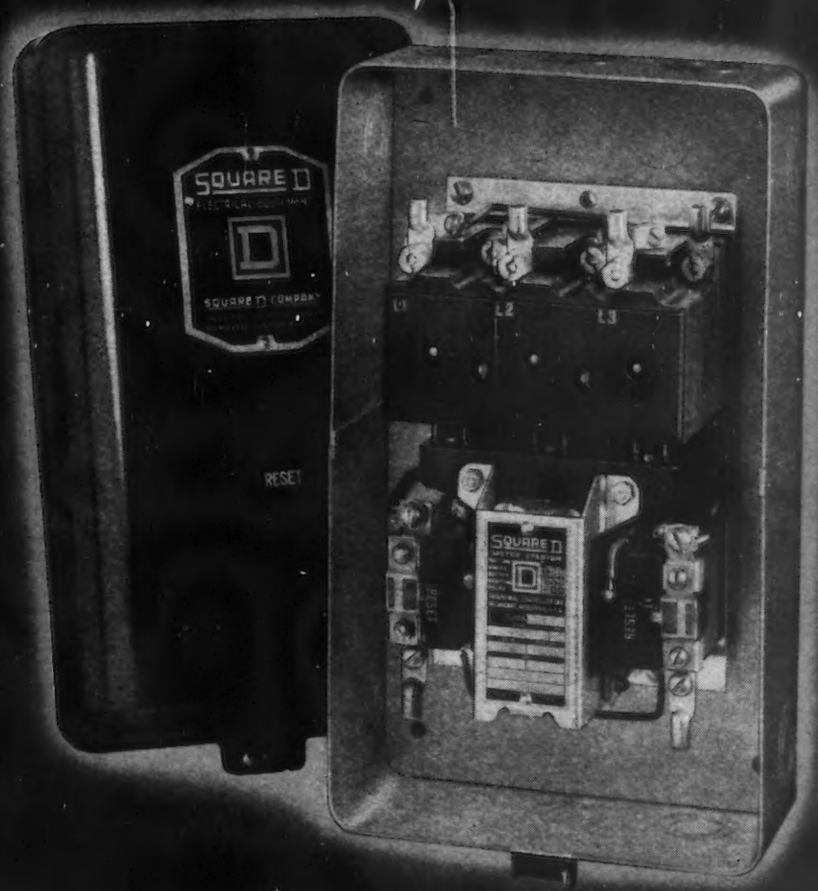

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government for the support of the Chambre Syndicale de la Siderurgie, which is the French steel federation. The employees of the steel firms pay about 6 pct of their weekly wages as their contribution to the various social security plans.

The amounts of the family allowances are potent political weapons, and are the political favorites of the Catholics in French politics. Thus, as Catholic influence increases, the rates may go even higher.

MODERNIZATION plans for the various steel works are gradually beginning to unfold, as the funds are becoming available for investment. M. Jean Raty, president of the Longwy steel mills, has disclosed that his firm contemplates the construction of an ore preparation plant and a sintering plant at their Mont St. Martin works, as well as the construction of a new openhearth furnace. In the firm's works in Sedan existing sheet mills will be modernized, and in Tucquenieux the power station is to be rebuilt.

The Denain and Anzin company, which in combination with one other firm will be putting up a new continuous strip mill, will soon put in operation an ore crushing plant at Escaudin, as well as a new refractory products plant. The construction of an 80-ton openhearth furnace which was started at the beginning of the war and abandoned during the occupation is to be taken up again in the near future. Modernization of the firm's plate and sheet mills which was started before the war is now being pushed forward once more, and important new work is being undertaken in the firm's ore mines.

New prices have been established for most scrap grades in France under orders which are effective retroactively to Oct. 1. The new prices for heavy grades range from a top of 1700 f. ($14.28) per metric ton down to 1100 f. ($9.24) per metric ton. Turnings in various grades range from a top of 1350 f. ($11.34) per ton to 800 f. ($6.72) per ton. For scrap grades free of copper a premium of 80 f. per ton is allowed. All of the above prices include at least 100 f. per ton for loading and 220 f. per ton for transport.

The 30,000 metric tons of scrap, mostly lead and steel which is to be realized from the breaking up of the "Pluto" pipelines between France and England, will be split between France and England, according to the terms of an agreement recently signed between the two countries. The lead division will be on a fifty-fifty basis, while all of the steel will probably go to France.

Two French Firms Pool Efforts To Build 66-In. Continuous Strip Mill

Valenciennes, France

• • • **The concentration of** French steel production in fewer mills contemplated under the 10-yr plan of modernization which is yet to be published, will find two of the largest firms in this region combining to construct a 66-in. continuous strip mill. The companies involved will be the Forges et Acieries du Nord et de l'Est (Forges and Steelworks of the North and East) and the Hauts-Fourneaux, Forges et Acieries de Denain et Anzin (Blast furnaces, Forges and Steelworks of Denain and Anzin). The steel capacity of the two companies, after completion of the modernization program in 3 or 4 yr, will reach 1.5 to 2 million tons a yr.

The new hot strip mill, one of two to be constructed in France under the postwar modernization program, will be located at Denain, and the Valenciennes steelworks that exists today of the North and East company will be utilized to concentrate all production of heavy rolled products, including heavy structural shapes, pit props, tube bars and forgings.

Under the rationalization program the merchant bar production for this area will be centralized in a mill in Louvroil, while a cold-reduction mill is to be built at Montataire about 30 miles from Paris. This location has been chosen to serve the many consumers of thin sheets in the Paris region, although it will be some distance from the hot strip mill at Denain. Shipment can be made by canal and under existing freight rates it will be cheaper to transport the semi-finished product than for the finished item.

As the modernization program is completed, a rolling mill now located at Anzin will be closed down, as well as an openhearth shop and jobbing mills at Hautmont. There will be certain rolling operations on specialized sections carried on at Hautmont, however (shapes for steel windows).

A provisional order has already been placed with United Engineering & Foundry Co. for the strip mill, and the cold reduction mill as well. These provisional arrangements are to be made final as soon as it is possible for the two firms to draw up a satisfactory financial arrangement for a new firm of common interest. It is probable that the two old companies will retain their corporate identities inside the structure of the new organization. Delivery of the strip mill is expected to begin 18 months after the orders are formalized.

The strip mills (hot mill and cold-reduction) are expected to cost about 5 billion francs ($42,000,000), and the entire modernization program for the two firms will total between 6 and 8 billion francs. The program is scheduled for completion within 3 yr.

Building Items Sent Abroad Amount to 3 Pct

Washington

• • • **Challenging statements** to the effect that large amounts of housing items are being exported, Paul F. Nitze, acting director of the State Dept.'s International Trade Policy, last week told the American Legion's special committee on housing that 1946 exports of such goods amounted to less than 3 pct of total domestic production.

Exports of closet bowls and water closets have been restricted to 3.6 pct, he declared, while bath tubs were held down to 1.7 pct. Nail exports were 2.3 pct; stoves, 2.2 pct, and furnaces only 0.5 pct.

Some measure of housing materials have to be exported, he explained, in order to obtain concessions for the import of such items as nickel, not produced at all in the United States, tin and copper.

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The picture above shows a piston from one of the company's two 750-h.p., 6-cylinder, 4-cycle, Worthington Diesels after 9,000 hours of operation. The engine was shut down at this time only for routine inspection.

Performance like this is typical of the results being obtained by hundreds of Diesel operators in plants throughout the country, and in all types and sizes of Diesel.

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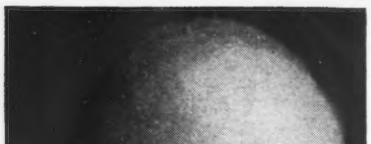


GEORGE P. TORRENCE, president, Link-Belt Co.

• **George P. Torrence,** executive vice-president of Link-Belt Co., Chicago, since July 1, has been named president of the company, succeeding **William C. Carter.** Mr. Torrence, in addition to his experience with Link-Belt Co., was general manager of Rayon Machinery Corp., a subsidiary of Industrial Rayon Corp., from 1936 to 1944, and president of Cleveland Pneumatic Tool Co. from 1944 to 1946. In his 25 yr with Link-Belt, Mr. Torrence served in various capacities beginning as draftsman. He was manager of the Indianapolis operations from 1926 to 1932 and president from 1932 to 1936. Mr. Carter, who had been president since December 1942, has retired from this position, but continues as a director of the company and as chairman of the executive committee of the board. Mr. Carter will also serve the company as a consultant.

• **Lewis D. Crusoe,** director of the planning and control division, and **Harold T. Youngren,** director of the engineering division, have been promoted to vice-presidents of Ford Motor Co., Dearborn, Mich. Before joining Ford, Mr. Crusoe was associated with the Fisher Bros. and the Fisher Body Div. of General Motors Corp. for 32 yr. Mr. Youngren came to Ford last June from Borg-Warner Corp., Chicago, where he was in charge of engineering development. Before joining Borg-Warner, he was for 11 yr chief engineer for the Olds Motor Div. of General Motors Corp.

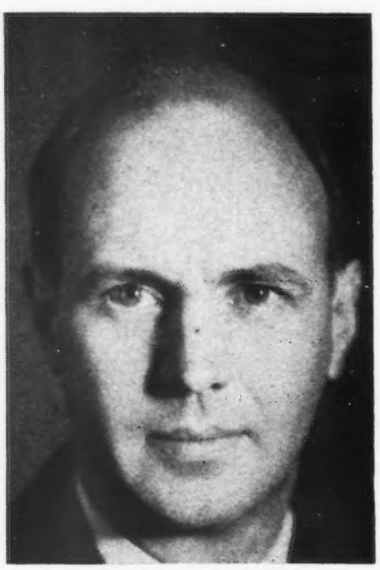
o o o

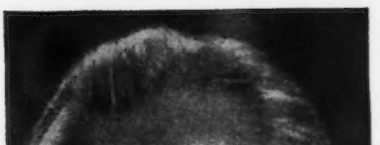
• **James W. Kettle** has been appointed works auditor of the Gary, Ind. sheet and tin mill, Carnegie-Illinois Steel Corp. He succeeds **Charles D. Henderson** who has retired after 40 yr of service with subsidiaries of the U. S. Steel Corp. Mr. Kettle started as timekeeper in the Gary plant of the American Bridge Co. and since June 1945 has been assistant supervisor of the Carnegie-Illinois statistics division in Pittsburgh.

• **Paul E. Bradfield,** who has been manager of the Los Angeles office of F. J. Hearty & Co., has been appointed to succeed the late Frank J. Hearty as president of the company.

• **Henry W. Luetkemeyer** has been promoted to chief engineer of the Cleveland Graphite Bronze Co., Cleveland. He has been associated with the company's engineering division since 1935 when he became a laboratory assistant, having previously served 2 yr in the production division. He was successively advanced to test engineer, product engineer, chief test engineer in charge of mechanical laboratory, and assistant chief engineer in charge of mechanical testing, research and development.

HENRY W. LUETKEMEYER, chief engineer, Cleveland Graphite Bronze Co.





O. P. MOON, general attorney and secretary, American Steel & Wire Co.

• **O. P. Moon** has been appointed general attorney and secretary of the American Steel & Wire Co., Cleveland, U. S. Steel Corp. subsidiary. Mr. Moon has been connected with the law department of Carnegie-Illinois Steel Corp. for the past 3 yr.

• **A. R. Sittig** has been appointed manager of manganese steel sales, and **E. L. Quinn,** assistant vice-president in charge of welding operations of the American Manganese Steel Div. of American Brake Shoe Co., Chicago Heights, Ill. **E. J. Nist** has been named assistant vice-president and will have his office in New York.

• **O. W. Irwin,** manager of sales, concrete bar division of Carnegie-Illinois Steel Corp., Pittsburgh, has retired. Mr. Irwin, who came to Carnegie-Illinois in 1935, was vice-president of Truscon Steel Co. in charge of the steel joist and reinforcing departments at that time. He had been employed by Truscon since 1911 when he joined the company as chief draftsman. The specialty products division, of which C. T. Siebert, Jr. is manager of sales, has now been made responsible for the distribution of concrete bars.

• **Waldor Schafer** has been appointed general sales manager for Ideal Industries Inc., Sycamore, Ill. Mr. Schafer resigned his previous position of vice-president in charge of sales of Edison General Electric Appliance Co. to take his new post.

• **Robert W. Smith,** veteran employee on the staff of George W. Rooney, vice-president and comptroller, U. S. Steel Corp. of Delaware, Pittsburgh, has retired. He had served over 47 yr with U. S. Steel subsidiaries, commencing his long service with U. S. Steel as an office boy in the New York office of National Tube Co. After several promotions, he was transferred to National Tube's Pittsburgh office. He was next employed by Illinois Steel Co., another U. S. Steel subsidiary, in 1906, becoming auditor before leaving the company. In 1936 he joined the U. S. Steel Corp. of New Jersey as assistant comptroller and was later made audit supervisor. He came to the Delaware Corp. as a member of the staff of the vice-president and comptroller in 1942.

• **T. Ames Wheeler** has been appointed statistician for the Allegheny Ludlum Steel Corp., Pittsburgh. Mr. Wheeler, who came to Allegheny Ludlum from the U. S. Steel Corp., where he was employed in the financial department for 4 yr, replaces Harold G. Rogers.

• **H. M. Dawson** has been appointed managing director of Jessop Steel International Corp., wholly owned subsidiary of Jessop Steel Co., Washington, Pa. Mr. Dawson's headquarters are in New York. Jessop Steel International Corp. was formerly known as Jessop Export Sales Corp.

H. M. DAWSON, managing director, Jessop Steel International Corp.

WALTER S. PRAEG (left), president, and J. IRVIN SCHULTZ (right), vice-president and treasurer, National Broach & Machine Co.

• **Walter S. Praeg** has been elected president of the National Broach & Machine Co., Detroit, succeeding the late Robert S. Drummond, and **J. Irvin Schultz** has been elected vice-president and treasurer. Mr. Praeg, former vice-president, has been a member of the organization since its beginning. Mr. Schultz, formerly treasurer, left Ernst & Ernst in 1933 to join the National Broach & Machine Co.

• **W. R. Battersby** has been appointed to cover Maine, New Hampshire and northeastern Massachusetts for the Monsanto Chemical Co.'s newly organized textile chemicals department. **T. E. Lannefeld** will handle Rhode Island, southeastern Massachusetts and eastern Connecticut; **E. S. Lamont,** with the exception of New York City, will cover New York State, Vermont, western Massachusetts and western Connecticut; **C. F. Bishop** is responsible for New York City, upper Pennsylvania and upper New Jersey. **E. H. McCoy** will handle Delaware, Maryland, lower Pennsylvania and lower New Jersey. **F. K. Burre** will cover Virginia, West Virginia and North and South Carolina, and **R. Gow** will take care of the middlewest, and **R. N. Foster,** the southern states. **Robert H. Baugh** has been named assistant branch manager of the Detroit sales district of the Monsanto Chemical Co., phosphate division.

• **Henry Chalfant,** assistant secretary of the National Supply Co., Pittsburgh, has been elected a director of the company. He fills the vacancy created by the retirement of **P. J. Shouvlin.**

• **James H. Smith,** assistant to F. L. Burke, vice-president in charge of the accessory divisions group, General Motors Corp., has been appointed general manager of the expanded central foundry division. His headquarters are in Saginaw, Mich. **S. W. Healy** has been appointed assistant to Mr. Smith.

• **W. M. Woodward** has been elected vice-president in charge of operations of Rotary Electric Steel Co. in Detroit.

• **Clifford A. Sharpe** has been named vice-president in charge of manufacturing of the Gar Wood Industries, Inc., Detroit.

• **Homer H. Woods,** Buffalo attorney, has been elected to the board of the Barcalo Mfg. Co., Buffalo.

• **Richard S. Lane** has been named general superintendent of the Ross Heater & Mfg. Co. of Buffalo, a division of American Radiator & Standard Sanitary Corp. He succeeds **James F. Murray** who has resigned to become president of the newly formed Winfield H. Smith Corp. Mr. Lane previously has been assistant chief engineer and production manager of the plant.

• **Edgar E. Brosius** has been appointed chairman of the board of the Edgar E. Brosius Co., Inc., Pittsburgh. **Leonard W. Bughman** has been named president; **J. E. Sullivan,** vice-president, and **James H. Davis,** secretary and treasurer.

• **Herbert R. White** has been made general manager of Eclipse Counterbore Co., Detroit. He began his career in 1911 with the original Hyatt Roller Bearing Co.

• **Thomas A. Vallee,** formerly with the Milwaukee Stamping Co., has resigned to become purchasing agent for United Mfg. & Service Co., Milwaukee.

• **Robert L. Burke,** formerly mechanical engineer for 8 yr with the Indianapolis Div. of RCA Mfg. Co., has been appointed midwestern sales representative of La Salle Engineering Co., Chicago.

WILSON A. WRIGHT, whose appointment as manager of sheet and strip sales of Republic Steel Corp. was announced in the Nov. 7 issue.

• **Dr. C. Robert Moulton** has joined the staff of the Bjorksten Laboratories, Chicago, as a research associate.

• **O. J. Malina** has been appointed sales manager of the heating and ventilating division of the D. J. Murray Mfg. Co., Wausau, Wis. Mr. Malina's office is located at Chicago where he has been located as Midwest representative of the company prior to his new appointment.

• **Norman A. Cobb,** former field service engineer for 19 yr with A. Leschen & Sons Rope Co., St. Louis, has been named the company's Pittsburgh distributor, operating as the Cobb Wire Rope & Supply Co. Associated with Mr. Cobb is **William J. Heintz,** who formerly was connected with the U. S. Steel Supply Co., Chicago, for 17 yr.

...OBITUARY...

• **Gustav A. Reuss,** 78, former president of the Pelton Steel Co., Milwaukee, died Oct. 28 after several months of illness.

• **Edwin J. Wilkie,** 57, manager of the technical sales division of the Bucyrus-Erie Co., Milwaukee, died Oct. 23.

• **J. Archer Turner,** 61, chairman of the board of directors of Turner Construction Co., New York, and its president from 1941 until Oct. 1 of this year, died Nov. 1 after a short illness.

• **Frank J. Hearty,** former president of F. J. Hearty & Co., Los Angeles and San Francisco, and West Coast representative of Edward Valves, Inc., died Nov. 3 after a short illness. Mr. Hearty headed the firm which represented Edward in the west for more than 25 yr.

• **Samuel H. Moore,** 65, former president, Chisholm-Moore Mfg. Co., and in recent years sales engineer for National Bronze & Aluminum Co., Cleveland, died Oct. 29. Mr. Moore was formerly a director of the Glidden Co., and was also one of the founders of Steel Improvement & Forge Co., and helped organize the concern which is the present Chase Brass & Copper Co., Inc.

• **Walter A. Ridings,** president of the Porter-Cable Machine Co., Syracuse, N. Y., died Oct. 17.

• **R. B. Nixon,** retired salesman for E. C. Atkins & Co., Indianapolis, died Oct. 7 of a cerebral hemorrhage. He became associated with the Atkins Co. in 1907, traveling out of Minneapolis and adjacent territory, later being transferred to the Virginia-North Carolina territory with headquarters at Norfolk. He retired from active service in 1945.

• **Clarence A. Newport,** 80, employee of E. C. Atkins & Co., Indianapolis, died recently. He started working for the company in 1886 as a helper in the circular saw department, went through various departments and in later years served as a general clerk in the handsaw department.

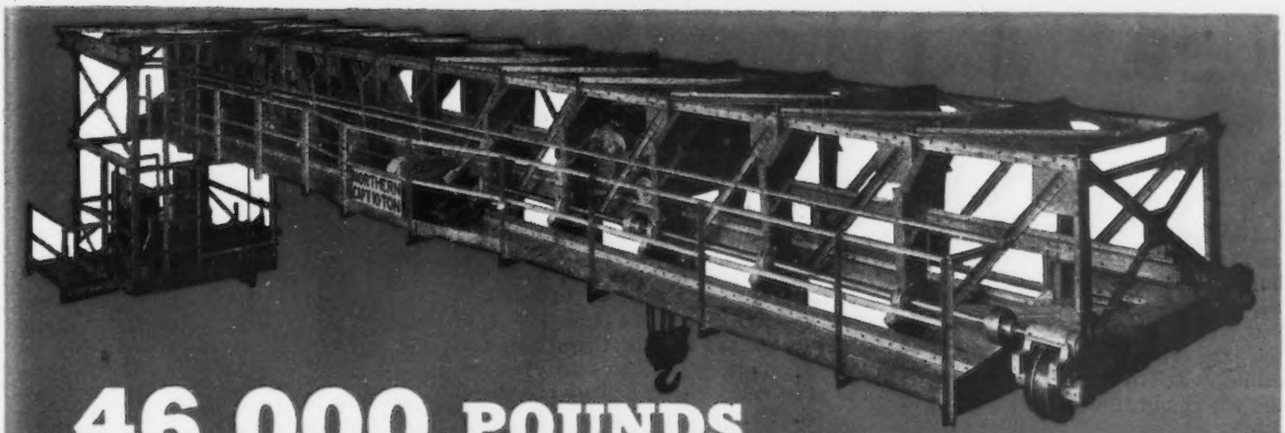
• **Leroy M. Wheeler,** 64, founder of the Wheeler Equipment Co., Buffalo, in 1923, died Oct. 29.

• **William Paulus,** 57, vice-president and factory manager of the Trico Products Corp., Buffalo, since 1936, died Oct. 29.

• **Irving L. Jones,** president of the International Heater Co., Utica, N. Y., died recently following an illness of several months. Mr. Jones began his career with the International Heater Co. as an office boy in 1896 when the firm was known as Russell Wheeler & Sons Co.

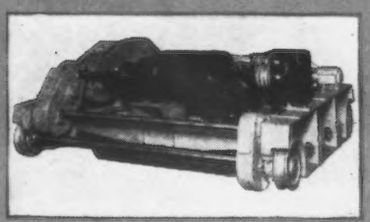
• **William A. Maxwell, Jr.,** 67, former president of the Colorado Fuel & Iron Corp., Denver, died Oct. 30 from a wound suffered in a hunting accident. Mr. Maxwell became associated with CF&I in 1927 as production engineer and was elected vice-president in charge of production in 1928. He became president in 1938, and resigned in 1945.

• **Howard B. Carpenter,** 64, formerly assistant vice-president in charge of production of Republic Steel Corp., Cleveland, died Oct. 28. Mr. Carpenter had first been employed by the Cambria Steel Co. and later became superintendent of the Cambria coke plant. In 1916 he went to the Colorado Fuel & Iron Corp. to run the coke plant and was promoted to general manager of its steel works there. In 1928 he was named manager of Republic Iron & Steel Co., Youngstown district. In 1935 he became manager of the Corrigan, McKinney plant in Cleveland.



46,000 POUNDS WEIGHT SAVED

ALUMINUM CRANE built by NORTHERN ... In Satisfactory Operation over 15 Years



Illustrated here is a crane of 10 ton capacity, 76' - 6" span, built almost entirely of aluminum alloy castings and rolled aluminum structural sections. The total weight including the trolley is only 30,000 pounds. The same crane, constructed of steel, weighs 76,000 pounds.

Six of these cranes have been in continuous service since 1929, and have proved satisfactory in every detail. The light weight has substantially reduced the cost of power. Operation is speeded and usefulness increased by the faster acceleration and deceleration. Light weight reduces wear on operating parts, and materially reduces the load on the building itself.

Use of aluminum in construction of these cranes is a unique application of light metals in the material handling field.

2074

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Dear Editor:

NHA ON BATHTUBS MINUS JOBS

Sir:

I have just come across the article on the pig iron situation in the Pittsburgh area as covered on p. 110 of the Sept. 25 issue, upon the basis of which you presumably wrote your editorial the following week on "Bathtubs Minus Jobs," in which you charge that the use of pig iron by the bathtub industry was threatening jobs on a wide basis, especially in the Pittsburgh area.

Since your magazine has always endeavored to factually report a situation in all matters affecting iron and steel, I trust you will be good enough to receive a correction to the information contained in Mr. Lloyd's article. I assume you will grant that the Civilian Production Administration's monthly report on Civilian Production for September 1946 can be considered a reliable source of information even though Mr. Lloyd seems to question figures issued by Mr. Wyatt.

1. On p. 24 of the CPA report, it states that July production of foundry and malleable grades of pig iron was 458,000 net tons, in August 450,000 tons and in September it is estimated to be about the same. Converted to gross tons this is 400,000 tons which controverts the statement in your magazine that current production is around 325,000 tons per month.

2. Your article goes on to state that housing pipe requirements for pig iron (presumably soil and pressure pipe) are taking 50 pct of output which would place this figure at 200,000 tons according to my calculations. Actually, according to the CPA report, total certifications of pig iron for all uses, including bathtubs, pipe farm machinery and brake shoes were only 134,000 gross tons in August, of which the Housing Program items constituted about 119,000 or about 30 pct of the available supply—and not 50 pct as the article and your editorial imply. This was not all pipe, as it covered some certifications for bathtubs, sinks, lavatories, furnaces and boilers.

3. **Again your editorial** implies that in the Pittsburgh area, bathtubs are the cause of shortage. Actually, of the total of 119,000 tons certified for the Housing Program, slightly over 17,000 tons were for plumbing fixtures, or less than 5 pct of the available national supply of foundry and malleable iron. In our opinion, it is a gross exaggeration to term this small "take" a threat to the jobs of the country. The proportion of this 17,000 tons which was taken in the Pittsburgh area was quite small, since much of the pig iron for this purpose is supplied from blast furnaces located in other cities. As to whether this use threatens jobs, it would appear that a job in a bathtub factory is just as much of a job as one in an electrical plant, an airbrake plant, or an ingot mold plant—all are equally essential industries. The lack of bathtubs is now holding up the completion of many homes; lack of these homes is causing acute hardships to veterans, and in many cities, makers of critical products report lack of housing as the principal reason for a shortage of labor. This is not an argument that bathtubs make more jobs than airbrakes or electric motors, but it is certainly open to question when you indicate that bathtub manufacture creates no jobs!

4. **As to your argument** that the reason why Westinghouse and Mesta cannot get more foundry pig iron is due to housing, we basically disagree. We think taking the case of the Pittsburgh supplier alone discloses the real cause of the shortage of foundry and malleable grades of pig iron; i.e., the undue concentration on the production of basic grades for steelmaking to offset the shortage of scrap. It seems to us somewhat absurd to charge the very small take of tonnage by the Housing Program in the Pittsburgh area where the sole merchant producer's output is around 24,000 tons a month as seriously affecting the rest of the economy, when there is in the Pittsburgh-Youngstown area a total production of all grades of pig iron of 1,912,000 tons in August.

Between July and August, the total production of pig iron in that district increased 34,000 tons. If only 25 pct of that increased production had been devoted to foundry iron, there would have been a sufficient supply for foundries in the Pittsburgh area. To put it another way, if only 1 pct of the pig iron output in the Pittsburgh area devoted to steelmaking grades of pig iron had been converted to foundry grades, it would have been more than enough to make up the deficit in that area, assuming that your figure of the Housing Program taking 50 pct of the 20,000-ton output of the Pittsburgh producer of merchant is correct. One might well say that the unbalance in our economy and the threat to jobs is far more endangered by an expansion of steelmaking grades as against foundrymaking grades of pig iron than by the minute amounts used for bathtubs (less than 1/3 of 1 pct of the total output of pig iron in this country)! This should not be taken to suggest that we have adequate supplies of steelmaking grades of iron—we obviously do not have enough of either, but in a period of scarcities of all items, a little slowing down of steelmaking grades to supply foundry grades might result in a better overall balance of output.

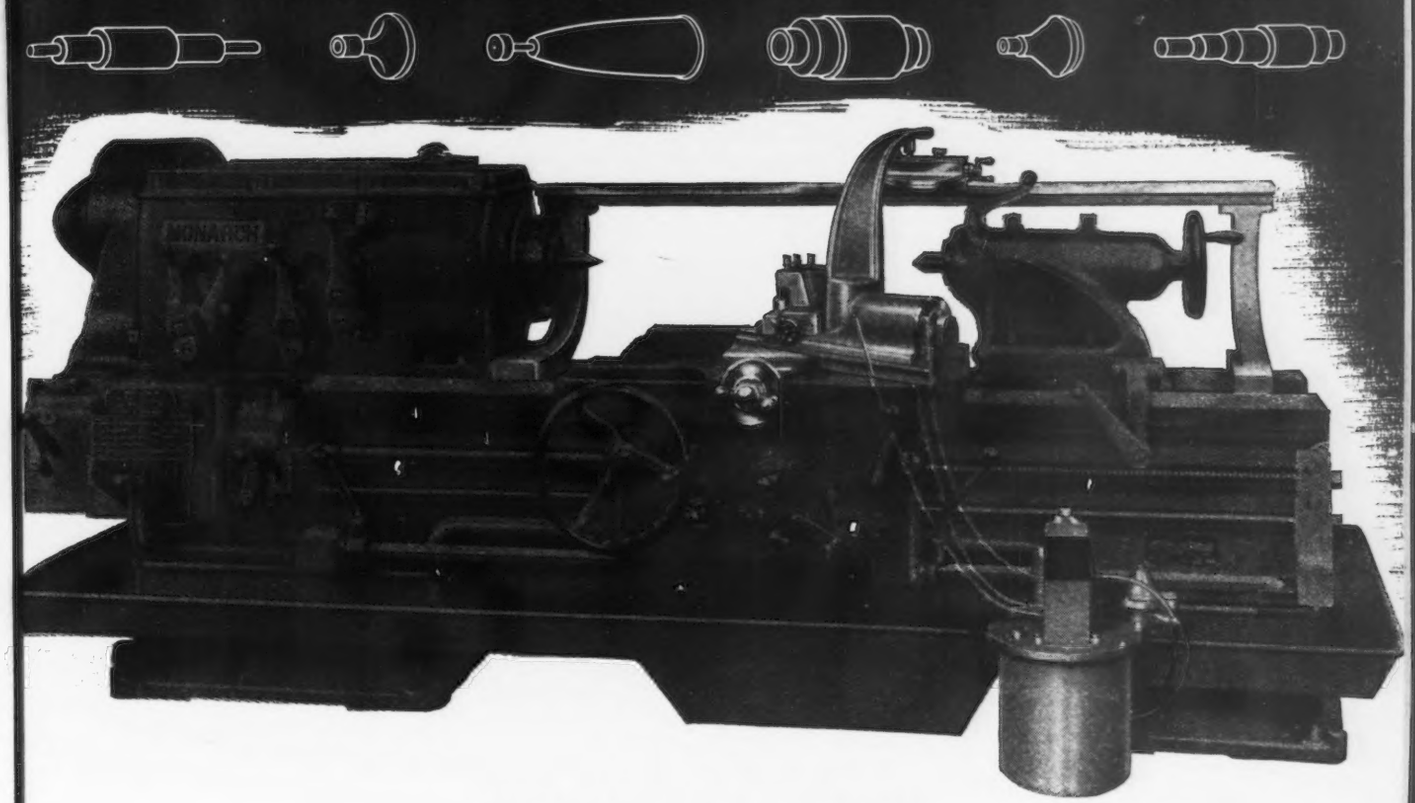
5. **Mr. Lloyd's article** states that soil and pressure pipe are now taking 50 pct of the foundry pig iron output as against 15 pct in 1941. As we have previously indicated, the Housing Program as a whole is only taking 30 pct of the output, and possibly soil and pressure pipe is 25 pct. We cannot verify where your 15 pct figure comes from, but it would imply that soil and pressure pipe output has sharply increased over 1941. This is not true. In 1941 the country produced 565,000 tons of soil pipe and about 1,100,000 tons of pressure pipe. In spite of admittedly increased needs for homes since 1941 and the long-deferred replacement needs of water and sewerage systems, the amount of pig iron we are now getting is supporting production at a current rate below 1941, in soil pipe, at an annual rate of 450,000 tons and pressure pipe of 900,000 tons.

6. I want to correct the impression given that all of the soil and pressure pipe demand for pig iron is something new, unnecessary and grossly exaggerated. Almost half of the pressure pipe, the largest single user of pig iron certified under the Housing Program, goes for the repair and maintenance of existing water lines used by factories, homes, and stores. If it were not for this essential repair need being met factories and stores might well shut down for lack of water, and certainly the possibilities of fire damage to the productive capacity of the nation greatly increased. . .

7. **Little credit has been** given to the efforts of the government to encourage increased foundry pig iron production—the only real solution to scarcities. The National Housing Agency has instituted a premium payment plan, effective Sept. 1, which the industry committee agreed unanimously should accomplish production increases. Under that plan, the Pittsburgh merchant producer felt that it would be possible to step up his output of foundry iron considerably. Arrangements have been made under the premium plan to bring in long-idle furnaces at Gadsden, Ala.; Troy, N. Y.; Indiana Harbor, Ind.; and Everett, Mass. These will bring in substantial tonnages in November and December. OPA has granted incentive price increases for cast iron scrap to bring out additional supplies. NHA has encouraged increased use of pressed steel, vitreous china, and concrete plumbing fixtures and clay sewer pipe and bituminized fiber drain pipe to relieve the demands for pig iron. . .

ALBERT BUTLER
Director
Basic Materials Div.
Office of Materials Supply
National Housing Agency

FOR TURNING CONTOURS AND STEP SHAFTS



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The "AIR-TRACER" has a proved production record for saving time, money and material on such diversified work as mandrels, punches, dies, nozzles, spinning chucks, impellers, valves, metering pins, molds—*and a wide range of step shafts.*

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- ★ **Stepless cutting-tool motion—*for increasing contours and a superior continuous finish.***
- ★ **Air-gage sensitivity combined with hydraulic power's versatility and ease of control—*an exclusive Monarch feature.***
- ★ **Automatic sizing eliminates repetitive setups and measurements—*for faster production, fewer rejects.***
- ★ **Continuous feed of slide on increasing diameters—*for more uniformly high finishes.***
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- ★ **Feed infinitely variable from 0 to 20" per minute—*for maximum machining efficiency on all materials and diameters.***

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Industrial News Summary...

- **Some Steel Price Adjustments Seen**
- **Scrap Grades Advance $2.50 a Ton**
- **Nonferrous Metals Rise Sharply**

PRICE increases made effective early this week in the metalworking industry, following the elimination of OPA price controls, reflected the sober thoughts of management now confronted with the possibility of runaway markets which in turn would create a buyers' resistance strong enough to start a business recession.

In the steel industry no leading steel producer this week made any changes whatsoever in the prices of steel products. Nor is any general across-the-board advance looked for at least until Philip Murray's United Steelworkers union makes known its wage demands. On the other hand at least one leading steel producer may within the next few weeks or more make a price adjustment for those steel products on which it claims a loss or a low return.

This steel company, along with others, had been negotiating with OPA for several months previous to the elimination of price controls for an adjustment on products which were showing little or no profit. Because steel companies normally announce steel prices on a quarterly basis a few weeks or a month before the beginning of a quarter, it is expected that an announcement on higher prices for some steel products will be made around the first of December or shortly thereafter.

STEELMAKERS were already faced with increased costs this week when the price of iron and steel scrap reacted to the elimination of controls by moving upward. In some major centers the net increase in important openhearth grades of scrap amounted to $2.50 a ton, but because of the tight situation most orders being placed were on an open basis—as the broker obtained the material, he delivered it to the steel company. This contrasted to some normal markets where the broker sells at a price a specific tonnage and then attempts to cover on the sale by picking up the material from dealers.

For the past several months No. 1 heavy melting steel and other similar grades have found their way into classifications carrying a higher price. For this reason the prices being paid today for premium grade scrap will, because of the shortage, cause the same No. 1 and No. 2 heavy melting to be applied on current orders. Thus while the statistical increase in scrap prices early this week was more than $2.50 a ton, the actual increase in the price to steel companies from what they were paying a week ago amounted to an average of $2.50.

Whether the current market prices on steel scrap will remain in effect the balance of this week is problematical. While some scrap is coming out at the new quotations, dealers are in no hurry to fill the orders. It may be at least a week or two before the entire scrap list is clarified and prices settle down.

The nonferrous market moved upward this week with copper being advanced 3⅛¢ per lb by two major producers to 17½¢ per lb delivered Connecticut Valley. Other producers are expected to meet this price. This initial raise, according to authorities, by no means disposes of the possibility of still higher prices in the immediate future.

A major producer early this week advanced the price of lead 2¼¢ per lb to a quotation of 10½¢ per lb at New York. Other producers are expected to meet this competitive position.

At New York zinc advanced from 8.69¢ per lb to 10.94¢. One of the largest increases in the nonferrous field occurred early this week when the sole producer of domestic antimony raised its price from 14½¢ per lb at Laredo, Tex., to 23½¢ per lb. The Office of Metals Reserve was expected to advance the price of pig tin to 69½¢ or 70¢ from a former domestic ceiling of 52¢ per lb.

THE removal of controls will have no drastic effect on the machine tool industry or machine tool prices as the industry shifts back into an era of competition in a virtually free economy. Few across-the-board increases are looked for in this major industry.

An overall lessening of extreme labor tension, a better distribution of steel products, a more workable pricing balance between various steel items and a sane pricing policy are a few of the results expected in the steel industry now that price and wage controls have been eliminated.

Steel producers, who have been forced to concentrate on the production of products on which a high return was realized and cutback output on low return items, will when price adjustments on the latter are eventually made be able to better serve their customers. A stepping up in the production of hard-to-get items will not only speed the output of finished manufactured goods but at the same time will deal a blow to the black market which existed to some extent in steel. This market was supported by some resellers who while buying steel from producers at legitimate ceiling prices charged from two to three times the allowed ceilings to ultimate purchasers.

SOME steel sources are slightly more optimistic over the industry's future labor problems. While the possibility of a strike early next year is not entirely ruled out, the fact that the U. S. Steel Corp. and the steel union will meet for the first time without the shadow of government interference may mean an agreement will be reached much sooner than was generally supposed. No matter what wage increase is subsequently granted it is a foregone conclusion that steel companies will be forced to advance prices in order to make up for all or part of the additional wage costs involved.

Steel ingot output this week continued at peacetime peak levels unchanged from last week's rate of 91.5 pct of rated capacity. The specter of a coal strike still hung over the industry, but there were more adherents to the opinion that this crisis might be passed without a sharp drop in steel production.

• **BETTER DISTRIBUTION**—As the result of the passing of steel price controls, steel customers within the next few months may find a better distribution of steel products because output of hard-to-get items can be expected to be expanded. Many steel companies since last March have concentrated on the production of the more profitable items and have eliminated or drastically cut output on the low-return products. An increase in prices for some of the latter might also mean a re-entry into markets by some firms which had withdrawn from such areas. It is certain that over the next 6 months the price relationships which existed between the various products before controls were slapped on will be evolved.

• **BLACK MARKETS**—Technically there is no longer a black market in steel products, but until production catches up with demand to a greater extent than at present, resellers will continue to demand a premium for hard-to-get items. These premiums, however, are expected to be somewhat lower on the whole than under OPA because there is no longer a ceiling for resellers and the premium prices may be spread over an entire carload instead of being concentrated on a specific part of a shipment. Black market prices were already subject to a buyers' strike before OPA went out because many small steel consumers flatly refused to pay exorbitant prices to strangers. The trend was for many of these small manufacturers to reduce their production schedules to a level consistent with legitimate steel deliveries.

• **STEEL SETS RECORD**—The steel industry produced 6,970,235 tons of ingots and steel for castings in October, a peacetime record tonnage, excluding 1941, and the highest monthly output since July 1945, according to the American Iron & Steel Institute. October was the fourth consecutive month of production exceeding 6,500,000 tons. Revised figures place September production at 6,517,894 tons. In October 1945 production was 5,596,776 tons, reflecting part of the effect of last autumn's strike of coal miners. The average operating rate during October was 89.3 pct of capacity, highest since May 1945. In September operations were at the rate of 86.4 pct of capacity, and in October 1945 the average rate was 69.0 pct. For the first 9 months of this year ingot production, as revised, totaled 47,343,579 net tons. This figure is less than 2,000,000 tons below similar figures for 1929, the high peacetime year for ingot production.

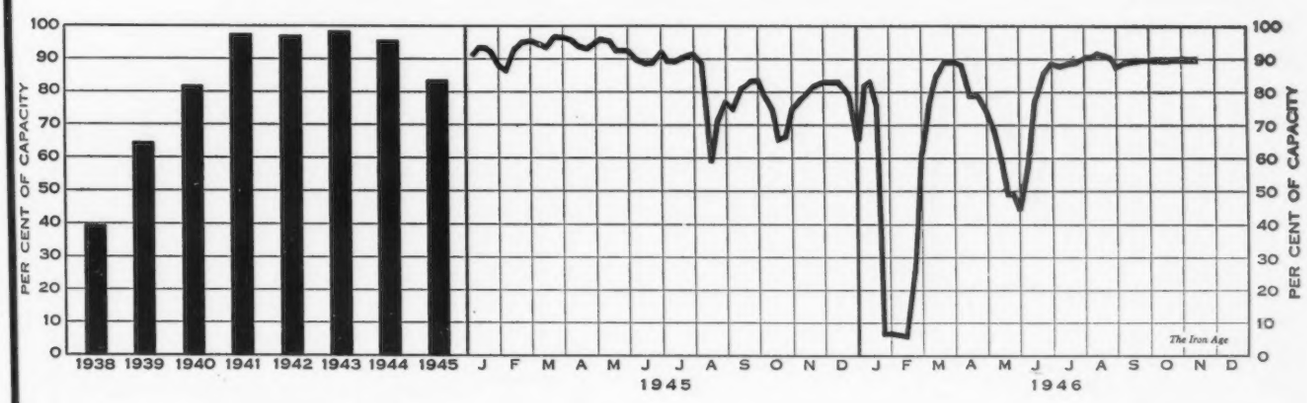
• **STEEL PRICE ANNOUNCEMENTS**—The steel industry soon is expected to see a return on the part of some steel firms to making quarterly steel price announcements. In the prewar years, the U. S. Steel Corp. was usually the first one to announce prices. Whatever the quotations were, other steel companies quickly met these conditions. It would not be surprising to see U. S. Steel Corp. make a price announcement on or after Dec. 1 this year to be applicable on first quarter shipments. Such an announcement will probably cover those products on which the company has been attempting to get a raise from OPA.

• **BUYS STEEL PLANT**—Borg-Warner Corp. has purchased the physical assets of the Superior Sheet Steel Co. of Canton, Ohio, to provide an additional source of sheet steel to increase production in the current housing emergency. Transfer of ownership will be effective Dec. 2. The Superior mill after the transfer will continue under its present management personnel as a division of Borg-Warner. The Superior plant employs approximately 600 men and has mechanized mills producing black sheets and cold-finished sheets. It also rolls terneplate, electrical silicon sheets, galvanized and galvannealed sheets.

• **SCRAP CONFUSION**—With buyers and brokers on the sidelines early this week it was only a question as to how long it would take for a large consumer suddenly to move in and garner a large tonnage of scrap at a new high figure. On past occasions when the market was on its way up smart buyers have often moved in and offered a satisfactory price thus taking tonnages of scrap from the hands of brokers or dealers who were waiting for such action. The combination of brokers covering on such an order and the consternation on the part of scrap consumers who were beaten to the punch and as a result offered higher prices has usually resulted in an active upward trend.

• **NEW GENEVA BASING POINT**—Effective Nov. 12, Geneva Steel Co., subsidiary of U. S. Steel Corp., established a basing point on standard structural shapes. The delivered price at Geneva is $2.525 per 100 lb in carload lots. This is equivalent to $2.50 per 100 lb f.o.b. Geneva, Utah. The present f.o.b. price for this product at Pacific ports is $3.035 per 100 lb. Until the freight rates on finished steel products from Geneva to the West Coast are reduced, it will be necessary for Geneva Steel Co. to absorb about $1.30 a ton on shipments of structural steel to West Coast Points, in order to meet competition there.

Steel Ingot Production by Districts and Per Cent of Capacity



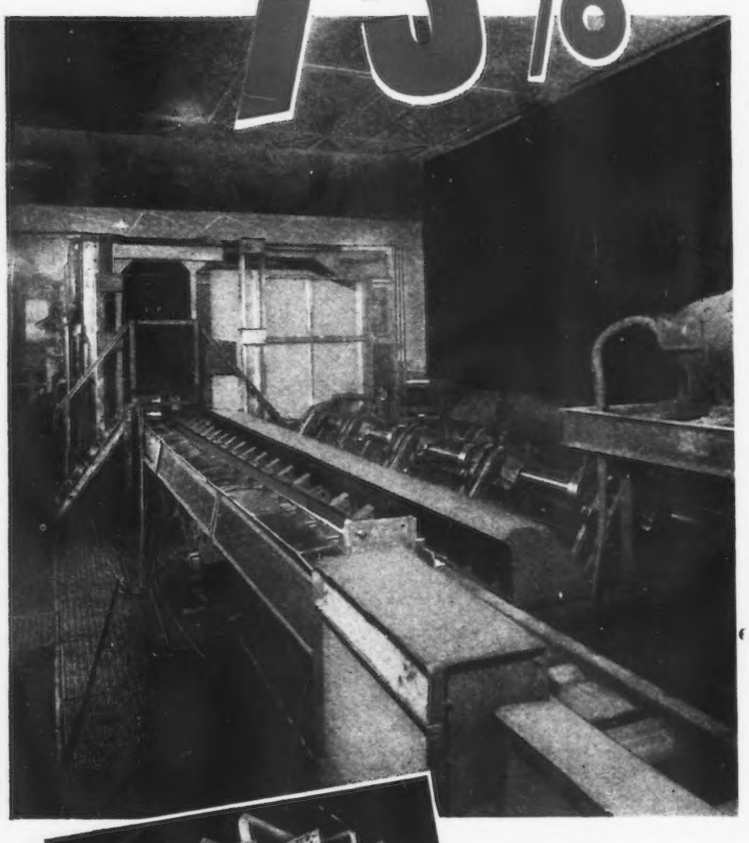
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
November 5....	98.5	94.0*	90.0	83.5	96.0	102.0	96.0	97.0	100.0	77.0	107.0	78.0	87.0	91.5
November 12...	99.0	93.5	90.0	83.5	98.5	102.0	96.0	97.0	102.5	75.0	103.0	78.0	89.0	91.5

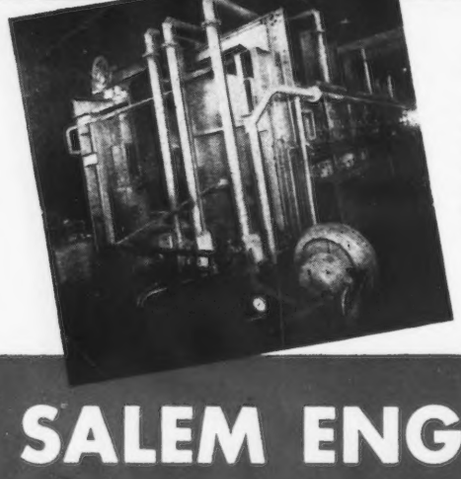
* Revised.

3000 pounds per hour...

75% investment savings

with the Salem Continuous Rod Heat Treating Furnace





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Producing at a rate of 3,000 pounds per hour, the furnace operates with one man at the charge end and one at the discharge end. Bar stock continues through the furnace automatically, the larger sizes being discharged one at a time, and the smaller sizes in small groups. Furnace temperatures range from 1600° to 1800°F., and each piece goes through the same heating cycle as any other piece, so that there is complete uniformity in the heating operation.

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TORONTO, ONTARIO, CANADA LONDON, ENGLAND

Labor Tension to Ease, Distribution to Improve With Controls Off

New York

• • • **An overall lessening** of extreme labor tension, a better distribution of basic metals, a more workable pricing balance between various products and a sane price advancing policy with an eye cocked toward customer resistance are a few results expected from the elimination of all price and wage controls over the metalworking field.

Industry wanted such action desperately. Now that it has it responsible members are of the opinion that major mistakes which would encourage foolish inflationary trends can be prevented.

From a labor standpoint, both John L. Lewis and Philip Murray are expected to demand and get substantial wage increases from the coal and steel industries. The road to the settlement, however, will be without the shadow of the government in the background for the first time in many years.

This, it is argued by labor and management experts, will bring forth the first real collective bargaining conferences since before the war. It may also mean that coal operators will get their mines back sooner than they had hoped for a few weeks ago.

Neither Mr. Lewis nor Mr. Murray have shown any interest in prices paid for coal and steel in prewar periods when both were attempting to get higher wages. Now with controls out the window it can be assumed that they will revert to this type of thinking as long as both squeeze out a pay advance for their members.

Whether or not coal operators and steelmakers will be willing to give higher wages and raise prices the full amount to cover such costs remains to be seen. It is a safe bet, however, in the opinion of some steel officials, that steel prices will be advanced all along the line next year if Mr. Murray and U. S. Steel agree to a 10 or 15 pct wage increase.

That coal will be raised in price following the coal wage negotiations at which a wage boost is likely seems to go without saying according to some reliable sources, despite the advance of competing fuels. Mr. Lewis may count on machine mining operations to meet such competition plus higher wages in those fields.

By TOM CAMPBELL
News-Markets Editor

o o o

Because the steel companies in 1939 followed the practice of announcing prices on a quarterly basis, it is expected that this method will be revived almost immediately. Before the war the general plan was for some companies to make their announcements at least a month before the beginning of a quarter.

Either a new price list was announced or the old prices were reaffirmed for the next quarter. In the present case it is almost a certainty that U. S. Steel Corp. will make known some price changes sometime after the first of December to be applicable on first quarter shipments.

In some past periods this company has not always announced prices on the first of the month preceding the quarter but this has been generally the case. An exception was made before the war when an announcement was held up until almost the beginning of the quarter in which the new prices applied. All announcements by this major company in recent prewar years stipulated "prices at time of shipment."

As a practical case, however, steel ordered and shipped before the quarter in which the new prices were to become effective (even though the announcements have read "effective immediately") were usually billed at the old price. In some cases old orders already on the books but shipped in the quarter in which higher prices were applicable were also billed at the old price because of customer relationships over a long period of years.

Because the U. S. Steel Corp. and other companies, under OPA rules, have been attempting for months to get price revisions on some items, it can be expected that the corporation will act quickly in announcing higher prices on products on which it claims to have been losing money. Some of such advances may involve sheet bars, concrete reinforcing bars, tinplate, structural steels and railroad materials such as rails and track accessories.

It is not likely that sheets and strip will be raised in the near future in view of adjustments which were made last Mar. 1. At that time tinplate ceilings were advanced but because of contracts already having been made with the large can companies it was impossible for the steel firms to get the higher price from other customers who were familiar with the price which the can companies were paying. Because of that situation no steel companies have been able to realize this year the higher price allowed to be charged for tinplate and other tin mill products.

It can be expected that tinplate may not only be advanced the $5.00 a ton which was allowed by OPA but may exceed this figure so steel firms can recoup the loss sustained this year because of can contracts. With price controls out the can companies will simply pass along the tinplate increase to

Steel Prices

New York

• • • Steel prices today are about 17.7 pct higher than the 1935-39 average and about 17 pct above the average for 1939, according to THE IRON AGE finished steel price composite. The index varies with the base price of key steel products and also with the quarterly distribution of the various items included in the composite.

Yearly statistics compared with the 1935-39 average are as follows:

FINISHED STEEL PRICES COMPOSITE		
Year	Cents Per Lb	Pct Deviation From 1935-39 Average
1935....	2.06779	—10
1936....	2.11814	—7.8
1937....	2.53620	+10.6
1938....	2.45874	+7.0
1939....	2.31088	+0.5
1940....	2.30096	+0.1
1941....	2.30467	+0.3
1942....	2.28249	—0.7
1943....	2.20176	—0.3
1944....	2.27298	—1.1
1945....	2.42274	+5.4
1946....	2.70711*	+17.7

(1935-39 average = 2.29835¢ per lb)
*Third Quarter.

can users. With demand for containers at an all-time high there is little chance that price competition from other materials will be a serious factor in 1947 in case tinplate is boosted for 1947 contracts.

Some steel makers are pointing out that the price increase of Mar. 1 this year did little more than bring basic steel prices to the level prevelant before price cutting caused a sharp slide in 1938. While many steel producers have been able to get a higher realized price (due to charging some extras that at one time were "forgotten"), the base prices on steel have not advanced anywhere near the amounts which have occurred in some other basic products.

It is noteworthy that all products made from steel use the base price of this product in setting up the price of finished articles. Hence any increase in steel will be passed all along the line to washers, ironers, freight cars, automobiles, etc. It is for this reason alone that the OPA early in the war closely controlled steel prices as a means to keep in check other items made from steel.

A steel price rise next spring to pay for any advance in wages to be made will probably be a horizontal or across-the-board raise. By that time it is expected that the price relationship between various steel products which existed before the war but which was knocked out by OPA controls will have been established. That such an across-the-board price raise will be unusually high is doubted in most responsible sources.

It is still recalled that the stiff advance made by a leading steel company in the spring of 1937 caused such a wave of inventory buying preceding the announcement of the raise (it had been rumored for many weeks before the announcement) that steel buying dropped so quickly, and cancellations were so heavy that before the fall of 1937 backlogs melted away in a matter of weeks although it had taken months to build them up. Even with this dissipation of backlogs steel users had bought so heavily to beat the price rise that steel purchased in 1937 was used by many users to coast through all of 1938 with little or no new ordering. Steel makers shudder when they think of that period which caused one of the sharpest price cutting sprees in normal times.

Steelmakers, many of whom have come up from the ranks since the old vicious price cutting days, appear to be far more conservative on the question of high steel prices than was the case in the 30's. According to some market authorities steel sales officials charged with obtaining the "best" price for a long pull stand want neither unreasonably high prices nor do they want to create a situation which will result in a price cutting orgy that will dry up demand as buyers await lower prices in somewhat the same way that customers stop buying when prices are skyrocketing.

Because of the change to a free market many steel officials who had feared a steel tieup in February now feel that there is a good chance that the steel companies and the union will come to some kind of a wage agreement without the necessity for a strike—especially since the government which has been a great aid in the past to labor has withdrawn from the picture with the junking of wage controls. U. S. Steel through Benjamin F. Fairless, its president, is more than anxious to make 1947 a year of production at a profit and Philip Murray likewise would like a year of uninterrupted employment—at higher wages. An agreement satisfactory to both is much more of a possibility this week than it was a few weeks ago—but the public will support both the wage increase and the higher steel prices which will result from it.

SWEDISH SCIENTIST: *Prof. Axel Hultgren, noted Swedish metallurgist, chats with Clyde Williams, director of Battelle Institute during the former's visit to the Ohio research foundation. Prof Hultgren, left, is the inventor of the electrode salt bath and numerous metallurgical publications.*

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Confusion Reigns At Major Scrap Centers

Pittsburgh

• • • **With Jones & Laughlin Steel Corp.** firing the opening gun by offering $2.50 a ton over OPA ceilings, across the board on all grades, on its present contracts, the scrap industry awoke on Nov. 11 to a situation more confused than at any time in its history, including 5 yr of government control. Shortly after the J & L offer became known, Carnegie-Illinois called in its suppliers in the district to try to determine what was happening in the market and to see if a solution to the confusion could be found.

J & L's offer was the only one that had any settling effect on the market, because it set specific prices for specific grades.

Other mills began by sitting tight to see what would happen. Pittsburgh Steel, Weirton, Crucible and others actually withdrew from the market on Monday to see what turn it would take. Likewise, dealers were sitting tight with their brokers to see what the market would offer—or more exactly how much the market will stand in the way of higher prices.

Less than 24 hr later some clarification began with a price advance of $5 over the old ceiling for No. 1 steel, an actual increase of $2.50 over what most buyers were paying for this grade. To this should be added a 50¢ brokerage fee.

Nonferrous Prices Up; Lead 10.50¢ New York; Zinc 10.94¢ New York

New York

• • • **Despite the** eagerness with which nonferrous metals producers looked toward a free market, decontrol found copper producers and some others unwilling to take the initiative in establishing market prices.

St. Joseph Lead Co. has raised its price for common lead to 10.50¢ per lb at New York, 10.35¢ at St. Louis. The former ceiling was 8.25¢, New York, 8.10¢, St. Louis. This price compares with a world price of 10.25¢, Gulf Ports. With duty applied, the price of imports becomes 11.60¢, f. a. s. New York. It is believed that this price will serve to cut out premium payments for those producers now receiving only the "A" premiums.

American Zinc, Lead & Smelting Co. has announced a price of 10.50¢ per lb for Prime Western slab zinc at East St. Louis, 10.94¢ at New York. The usual premiums for other grades apply. The price has been established below the world price of 10.625¢ so as to encourage importation of foreign zinc even with payment of duty.

Most copper producers executive offices were closed for the holiday on Monday. However, conferences were underway in some companies to establish a price policy, but there was no announcement of the action taken, if any. The world price for copper is 17.50¢ per lb, 3.1254¢ per lb above the former domestic ceiling price.

The price of tin is dependent on the action of the Office of Metals Reserve, the largest seller in the domestic market. Government offices were closed on Monday so it was not possible to establish the new price of tin.

The Texas Smelting & Refining Co. of Laredo, Tex., is conferring on a price increase for antimony and admits that an increase of at least several cents per pound may be expected. The former ceiling price was 14.50¢ per lb, Laredo, Tex. The current world price is estimated to be 23¢ per lb.

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Machine Tool Builders See Few Price Changes, Hope Parts Will Ease

Cleveland

• • • **Removal of controls** will have no drastic effect on the machine tool industry or machine tool prices, as the industry shifts back into an era of competition in a virtually free economy, according to industry leaders here.

While removal of controls presages higher-cost components, the machine tool industry needs new firm orders, and while one major producer here raised prices on two machines 10 pct last Friday because of electrical equipment costs, few across-the-board price increases are expected.

Machine tool builders are faced with a stiff competitive situation, both at home and abroad, and any price adjustments will be made with this in mind, even in the case of higher component costs and those machines on which a builder has not been breaking even.

Prices of machine tools weighing over 2000 lb have been practically free since last spring when OPA allowed a 20 pct price increase, of which many builders took no advantage at all. Removal of controls frees the smaller machines, those under 2000 lb, but again the competitive situation is such that caution will be the keynote in any price increase.

With the War Assets Administration selling many machine tools from the surplus which are still stock items with members of the industry, at merely a fraction of their original cost and builders' present prices, the new models will probably be subject to price adjustment first. As manufacturing costs increase, all units may follow.

Major segments of the industry are pretty well prepared to pay higher costs for component parts, and are hopeful that higher prices will mean an expansion of production. A number of machine tool builders have been seriously hampered by the shortage of castings and feel that pig iron will now be in such supply that machine tool production can be sustained without interruption from this source.

Price increases and adjustments are going to be made in the machine tool industry, but the prime need is still new firm orders and not higher prices.

Washington Shows Great Concern Over Prospect Of Boom-Bust Period

Washington

• • • **Now that President Truman** has decontrolled wages and all prices, except on sugar, rice and rents, effective at 12.01 a.m. Nov. 10, official Washington is showing the greatest concern over the prospect of a boom and bust period. But statements from the steel and other industries indicate that they will pursue a course of restraint, so as to avoid an upset of the returned free economy upon which they have been insisting since the end of the war. However, industry has made it evident that it is fully aware that an unreasonable price rise will develop excessive demands for wage increases, thus establishing a vicious inflationary cycle that will result in a severe depression. As it is, labor itself apparently is inclined to moderate demands if prices are not allowed to rise unreasonably.

The steel industry still has fresh in mind the bust that grew out of the highly inflated market of 1919-1920.

The only government wartime halter now on industry generally is its exercise of priorities and allocations under the Second War Powers Act, plus NHA's broad powers.

CPA continues, under the direction of NHA chief Wilson W. Wyatt to grant priorities and allocations of so-called scarce building materials and components, including iron and steel products.

Unless the president hastens its liquidation such as has been done with respect to OPA, CPA will expire under the Second War Powers Act on Mar. 31. It is doubted that the new Republican Congress will ask for the death of CPA before that time. The passing of CPA will mean the end of all the Government's emergency controls, except those lodged with NHA and OPA. It is likely that OPA's liquidation will be speedy and its remaining functions distributed among other government agencies. Also it is probable that NHA is due for a drastic overhauling soon after the new Congress convenes.

Meanwhile, subsidies on metals in all likelihood will continue through June 1947 as provided in

the stabilization statutes. These metals include copper, lead, zinc and tin. In addition, NHA, under the Emergency Housing Act, Mr. Wyatt has announced, "Premium payments will continue on all plans now in effect, unless modifications are made necessary by sharp prices on the items concerned." Among products on which NHA is paying premiums are pig iron, cast iron soil pipe, galvanized and black carbon sheets, nails, and convector radiations.

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Fabricators See No Runaway Prices But Some Changes Are Due

Chicago

• • • **Manufacturers of metal** products have enthusiastically welcomed the lifting of government control. The only exception taken to this action is that it should have been done sooner. All fabricators are in agreement that some prices will show an immediate rise that cannot possibly be avoided but unless there is a general reoccurrence of strikes for higher wages, prices will not skyrocket. Because of increases in material and labor which had a permanent affect on costs, prices of all fabricated products cannot possibly return to prewar levels.

With the return of a free economy, wherein supply and demand are governing the market, comes the sobering influence of competition. Makers of all metal products have suddenly turned their heads and are closely watching their competitors. In spite of the huge demand for goods, all manufacturers and sellers are very conscious of the pitfalls which lie ahead.

One conception is quite prominent in this area, that is that nobody is going to price themselves out of the market. Warnings have been generally sounded that dislocated prices are inevitable but most executives believe that the condition will be temporary and will not be broad enough to have any important bearing on markets in general.

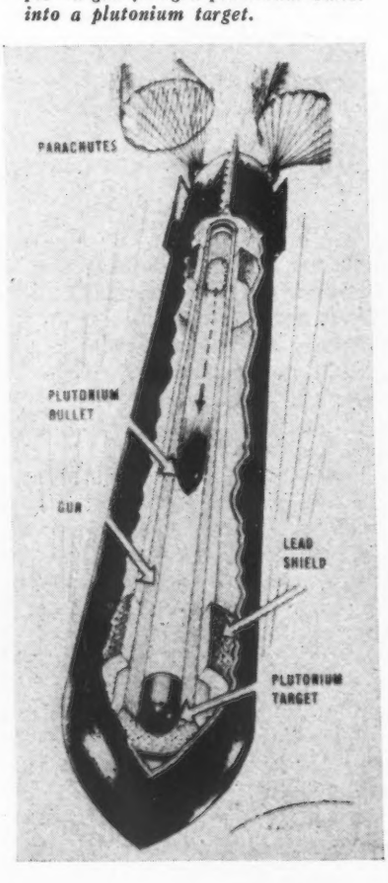
Users of metals point out that the future price level of goods will be determined by cost of steel and other products. The steel producers are emphatic in their statements that an across-the-board increase is not in the immediate offing. They are equally insistent that some products must go up and it is the concensus that galvanized sheets will be first. Small castings are slated to jump but on the whole larger industries will take a little time and will be cautious in their efforts to balance prices with costs.

It will take about a week to indicate what the new scrap prices will be in all metals. Prices of scrap will markedly affect the new steel prices and here again nobody seems willing to accelerate the impending rise. The natural characteristics of the scrap market have caused this industry to be first to register advances. How much scrap prices increase will be very important and all eyes will be focused at that point for the next few weeks.

One other result of the lifting of controls will be the decisions of steel buyers as to which way to play the market. Many consumers have continued to buy all they could get of all items figuring that on a rising market they cannot possibly lose. Others, who are more cognizant of their unbalanced inventories, are now starting to cut back on the basis that now is not the time to overextend their purchases.

Uncertainties about labor is most often cited here as the levening factor to the continued all out scramble for steel. Nobody is sure what labor will do. The best guess that is being advanced is that labor will not unduly irritate the new congress. If this proves to be the case, leading industrialists believe the return to normal will be gradual and orderly. The alternative, in the minds of most manufacturers, is not pleasant as it is firmly held that continued high production with reasonable price increases are a must and major production disturbance offers nothing but chaos.

A-BOMB? *Artist's conception of the atomic bomb as published early this month by the London Daily Express. He makes it look quite simple—a gun firing a plutonium bullet into a plutonium target.*



Sheet Bar Subsidy Now Subject of Speculation With Price Control Off

Pittsburgh

• • • **The subsidy granted** by the Reconstruction Finance Corp. on sheet bars becomes a subject of speculation with the decontrol of steel prices. The two suppliers, Jones & Laughlin Steel Corp., and Sharon Steel Corp., are protected at least for the time being in that their sales contract is made with the RFC rather than the ultimate consumer. RFC agrees to buy at a specific price, in the neighborhood of $45 a ton, and sells to such consumers as Apollo Steel, Mahoning Valley, Reeves, etc., at the old ceiling price of $38.00 a ton.

The question that occurs now is that, with decontrol, will RFC continue to subsidize the price of sheet bar. The main producers do not yet know. J&L at least would prefer to get out of the sheet bar business entirely, and would now have been out except for the directives or allocations they received. Sharon has agreed to service Mahoning Valley Steel Co., now owned by General Electric, so they are more or less committed.

J&L's contract with RFC runs out in November, whereas Sharon's doesn't run out until the middle of the first quarter of 1947. Neither company will sell at $38 a ton, and no independent hand mill can afford to operate at $45 a ton unless the price of its sheets is boosted commensurately. However, without an

increase in the price of hot-rolled sheets from continuous mills, it is questionable that, except for a very short time, these mills can boost the price of sheets over the going market price.

Actually, Reeves is the only completely independent unit still in operation in this area, the other being sold out to various sheet consumers. These consumers of sheet may be willing to pay a tariff for sheet bars to keep their sheet sources producing, and make up the added costs in finished products. Actually, the value of the sheets in the finished products is frequently such a small part of the total cost of the item that even a $10 a ton boost in sheet bar prices is insignificant in the price of the finished item.

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General Motors Corp. Raises Car Prices By $100 Across the Board

Detroit

• • • **General Motors Corp.** has raised the price of passenger cars produced in the United States and Canada by $100 across the board. The price rise is immediately effective as is a similar boost of $100 in the price of Chevrolet and General Motors light trucks. Prices of heavier truck models have been previously adjusted and will not be changed at this time, according to the GM announcement.

Ford has definitely announced that no price increase is contemplated at this time and there are indications that Chrysler will not move immediately to adjust the price of its cars.

In announcing the price advance, C. E. Wilson, president of General Motors explained that the new prices were required to offset increased costs of production and that this means had been taken to offset unfair price discrimination against General Motors under former OPA ceilings.

An application was filed by General Motors with OPA more than 2 months ago, Mr. Wilson said, which would if granted have resulted in an increase of approximately $100 per passenger unit.

No adjustment in the price of automotive parts is contemplated at this time, according to Mr. Wilson although price adjustments by several GM divisions, including Frigidaire and Delco will be made in the near future.

Before the increase, Chevrolet prices were reported to be from $110 to $165 less than the corresponding prices of competitive Ford models.

It is expected that the price of used cars at Detroit will be raised immediately and a spokesman for the used car industry has indicated that used car prices might be revised upward as much as 20 pct in the next 2 weeks.

GE to Operate Atomic Lab in Schenectady

New York

• • • **The War Dept.** has announced plans for the establishments of $20 million nuclear research laboratory near Schenectady, for the study of power generation from atomic energy.

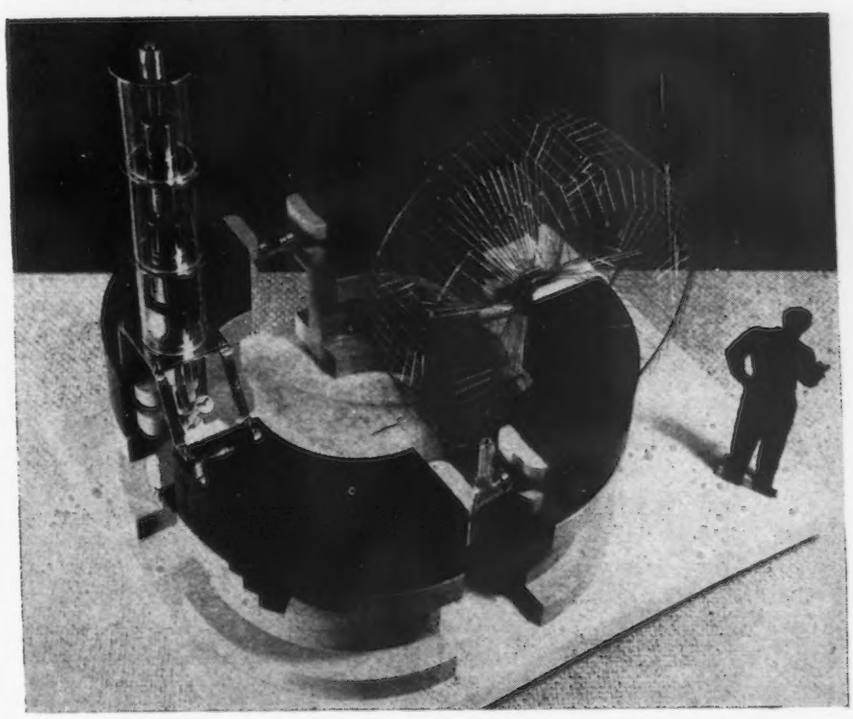
Maj. Gen. L. R. Groves, Chief of the Manhattan Project, stated that the General Electric Co., under a contract made several months ago, would operate the nuclear power research center and is serving as the prime contractor for design and construction.

"Named the Knolls Atomic Power Laboratory, this will be the fourth in the network of laboratories established by the Manhattan Project to further nuclear research," said General Groves. "The work on this program began many months ago and will be transferred to the Atomic Energy Commission as a part of the broad peacetime development program.

"Research work in all phases of atomic power development will be carried on in the Knolls Atomic Power Laboratory. In addition research on specific problems in connection with the operation of Hanford Engineer Works, operated by General Electric's chemical department will be carried out in the new facility."

Land for the Knolls Atomic Power Laboratory will be provided by General Electric adjoining the site of the new General Electric research laboratory now under construction where the company's fundamental research in other fields will be concentrated. Although the two laboratories will be operated together, the government-sponsored atomic power laboratory will be separate from the General Electric research laboratory.

ATOM SMASHER: *Model of the 300 million v synchrotron of a new "race track" design now under construction by the University of Michigan at Ann Arbor, in association with the Johns Hopkins applied physics laboratory. It will produce energy similar to that of cosmic rays and permit scientists to go a step beyond atom smashing and study sub nuclear particles.*



Republican Congress Heralds Return of Free Enterprise

Washington

• • • **Return of the** Republican party to control of Congress after 14 yr of New Deal control of both the legislative and executive branches of government has been hailed by business generally as an omen of relief from government harassments. Regimentation, one-sided labor laws, excessive taxation, unbridled spending, waste and a top-heavy bureaucracy are some of the things of which free enterprise has loudly complained

The swift turn to the right as the congressional landslide elections of Nov. 5 have been called, swept Republican majorities into both the House and the Senate. The partisan majorities, six in the Senate and 28 in the House are buttressed by probable coalitions with conservative Democrats on various legislative programs.

Giving further emphasis to the dominance of the Republicans was the defeat in both branches of Congress of a strong labor bloc that consistently followed the dictates of CIO, rather than of AFL

By L. W. MOFFETT
Washington Bureau

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where there were any differences between the two powerful labor organizations in legislation. Outstanding New Dealers in this category were Senators Joseph G. Guffey of Pennsylvania; James M. Tunnel, Delaware; Abe Murdock, Utah; Hugh G. Mitchell, Washington and James M. Mead, New York; Representatives John Coffee, California; Michael J. Bradley and John M. Sheridan, Pennsylvania; Hugh DeLacy, Washington; Frank E. Hook, Michigan; Andrew J. Bremiller, Wisconsin; C. M. Barley, West Virginia and James P. Geelan, Connecticut.

But simply to cite the Republican victory and to airily assume it means a wide change in national policy overlooks several factors. At the outset it is generally accepted as a fact that, running true to historic precedent, there was a large vote of protest against the ins rather than a vote for the outs. There is no way of telling just what proportion this was of the total vote or of the vote against federal control over the national economy and individual lives of the people. The latter vote also was large. But even it, unless it was infinitesimal, was not a vote for a complete overturn of what is conceded to be progressive legislation, even though the administration of it often has been distorted.

Republicans coming into power have plainly indicated that they do not intend to upset everything that has been done during the long period they have been out of power. They are aware that to do so would in 2 yr likely mean a government much more radical than has ever been in control. They have particularly in mind the world trend by which, for example, England has turned socialistic.

They are aware too that they would never have regained power without a heavy vote from labor, both organized and unorganized, and they are not expected by any means to propose unduly restrictive labor legislation. Modification of the Wagner Act, passage of some such legislation as the Ball-Burton-Hatch Bill, which was not even given the benefit of hearings, or possibly of the vetoed Case bill might however, be expected in some form.

Even large labor segments, despite claims of organized labor groups, are favorable to curbing some of labor's powers, the barring of secondary boycotts, making employees equally responsible with management for violations, voluntary arbitration and the jettisoning of labor boards that almost invariably hold with organized labor against both management and independent labor. Even organized labor groups are demanding less Washington interference and a return to collective bargaining. Moreover, any attempt at excessive labor restrictions would meet with strong protest within Republican Congressional ranks.

Senator Joseph Ball of Minnesota together with a strong fol-

ARMY'S NEWEST, WORLD'S LARGEST: *Flight view of the* 139-*ton Consolidated Vultee B-36 one of the Army's new series of bombers which carry* 10,000 *lb for* 10,000 *miles. The AAF states that the B-36 can carry an atomic bomb to any inhabited part of the world and return without refueling. It is powered by six* 3000 *hp Pratt & Whitney engines driving* 19-*ft pusher propellers.*

lowing who will be in the Eightieth Congress would lead a fight against such legislation if it were proposed. There also remains the important fact that the veto by a Democratic President would undoubtedly face such legislation if by chance it should be enacted, and it would be hard to override even by the new Congress with its Republican majority. Some measure such as the Case antistrike bill, however, might get through since it was by only a slim margin that it failed of passage over President Truman's vote.

The Republicans keynoted their campaign chiefly by going on record for reduction in taxes; reduction of government personnel and other economies in government and discarding of government controls.

Action along these lines is expected but its extent is uncertain. Representative Harold Knutson, Minnesota, who will undoubtedly head the Ways and Means Committee insists he will push legislation for a 20 pct reduction in individual income taxes, amounting to $3 billion, effective for the calendar year 1947. Then there will be, he says, a second tax bill in which hearings will begin early in February directed to the elimination of some and downward adjustment of other excise taxes and to administrative amendment of the revenue code.

"Our immediate goal will be to cut expenditures, balance the budget, establish a surplus each year to apply to the national debt and grant as much relief to a tax burdened nation as sound fiscal policies under governmental economies will permit," said Mr. Knutson, who has a reputation of being economy-minded, one fact that the country as a whole had in mind when it went to the polls recently. Mr. Knutson strongly dislikes the Hull reciprocal tariff program and may attempt to kill it, but it is doubted that this can be done.

Senator Taft of Ohio and other prominent Republican leaders have voiced a similar policy. The Ohio Senator will have an opportunity to aid greatly in effectuating such a policy, at least as far as Congress is concerned, since he probably will be both the majority leader in the Senate and Chairman of the Finance Committee, which is the counterpart of the Ways and Means Committee as a revenue raising and tax legislation committee. Among Senator Taft's activities at the recent session of Congress were his opposition to OPA, his fight for higher ceilings, strong support of the Case bill, and his effort to mend the employment bill so as to prohibit government competition with private enterprise. These activities will no doubt be resumed by Republican leaders.

There is every likelihood that the Republicans will make a substantial cut in the swollen government personnel, but it is a question whether it will be as sharp as some of the leaders have advocated. The cut under the administration has been comparatively small considering the peacetime needs as compared with war employment, which itself is held to have been greatly expanded beyond actual requirements.

Patronage in government employment and bureaus fascinates any political party and for this reason there is considerable skepticism that the slashes will be as great as the public has been led to believe they will be. Heading the House and Senate Appropriations Committee probably will be Representative Taber of New York and Senator Style Bridges of New Hampshire, respectively. Both have been advocates of economy in government and may succeed in cutting appropriations a great deal. This of course would mean slashes in government personnel and bureaus. Senator Taft visions a budget cut of from $25 to $30 billion in 2 yr, compared with the present budget of $43 billion.

There is no reason to think subsidies on metals will be abruptly cut off despite such advocacy by some Republican groups. The majority of the Republicans are expected to go along with Senator Taft who has said these and other subsidies should be continued through the present fiscal year ending June 30, 1947.

On the international political policy, contrary to the tenor of the foreign press, there probably will be little if any change. A bi-partisan policy in this field, now indicated by the association of Senator Vandenburg, R., Michigan, and former Republican Senator Austin of Vermont with UN, likely will be maintained. This is strengthened by the fact that Senator Vandenburg probably will be chairman of the Senate Foreign Relations Committee.

INDUSTRIAL RADIO: *Pullman Standard Car Mfg. Co., Michigan City, Ind., is said to be the first industrial firm to employ 2-way radio in its plant. Here is Charles Bader talking to the dispatcher from the cab of his yard locomotive.*

Steel Union Threatens to Sue For Millions in "Walking Time" Payments

By GEORGE F. SULLIVAN
Associate Editor

New York

• • • **Most of the nation's** steel companies face suits that may add up to several hundred million dollars as a result of union plans to seek walking time pay based on a recent Supreme Court decision. The United Steelworkers of America, CIO, last week announced its intention to sound out and assist its membership in preparing claims for extra compensation following its study of the June 10, 1946, decision of the U. S. Supreme Court in the case of Anderson v. Mt. Clemens Pottery Co.

The majority opinion of the Supreme Court in the Mt. Clemens case held that "Since the statutory workweek includes all time during which an employee is necessarily required to be on the employer's premises, on duty or at a prescribed workplace, the time spent in these activities must be accorded appropriate compensation."

The steel union contends that many of its members spend a substantial amount of time walking from time clocks to parts of plants considerably removed from those clocks. It proposes therefore to use this case to draw up claims for extra pay as far back as the state statutes of limitations will permit, based on alleged violations of the Fair Labor Standards Act of June 25, 1938.

The task of getting together the statements and claims from steel company employees will be done by the district labor offices of the USWA. When all the data is assembled it will be turned over to Lee Pressman, CIO counsel, for advice and necessary action. Further action may or may not be taken by local attorneys.

It is explained that this action will cover only past wages which the union claims are due. There will still remain the demand that all future time be taken care of.

Because statutes of limitations vary in different states, and since walking time varies in all plants, no estimate of the actual amount that may be claimed is available. A recent portal to portal pay settlement by a chemical company averaged approximately $360, a figure said to be substantially higher than the average steelworker could expect.

A further complicating factor is that during the war the workweek averaged more than 40 hr, while this year the average steel workweek has been several hours less than 40. Under the Fair Labor Standards Act the employee who is able to prove a violation, whether willful or not, is entitled to double damages. Thus a successful suit based on 1944 experience would net an employee triple time, i.e. time and a half doubled; currently the award would be straight time doubled.

Following that part of the majority opinion quoted in the second paragraph of this article the Court added that since no claim was made in the Mt. Clemens case concerning the time spent in waiting to punch the time clocks it would not explore that aspect of the action. Lawyers have called this a "time clock to work bench" rather than a "portal to portal" case.

The problem for the individual manufacturer is therefore one of considering the various times involved within his plants for the shortest trip from the time clocks to the places of work, adding any substantial time required to prepare machines for work, sharpen tools, apply special protective clothes or greases and similar make ready action.

Philip Murray, head of the USWA-CIO, declared recently in Chicago that his union would investigate all cases in which the workers felt they had a legitimate grievance. The union intended to find out, he asserted, why the steel companies had not acted sooner in this matter—why they had failed to live up to the law of the land.

Steel officials have not yet commented on the union announcement. A few weeks ago, however, Eugene G. Grace, chairman of the board, Bethlehem Steel Corp., expressed his opinion of decisions which levy charges against past operations. It is exceedingly difficult to do business, he affirmed, when you have no idea what sort of retroactive action will come along to change your costs.

The decision in the Mt. Clemens case was 6 to 2. In writing the dissenting opinion, Mr. Justice Burton, Mr. Justice Frankfurter concurring, stated that it was unfair to penalize an employer in view of the exceedingly small amount of time involved. Such time was not only non-productive, but cumbersome and futile to measure.

There was no evidence, the dissenting opinion continued, that Congress (in the Fair Labor Standards Act) had meant to redefine "starting time" and "quitting time."

The majority opinion admitted that walking time for certain employees in the Mt. Clemens plant was measured in seconds, or amounted to just a few minutes, and therefore fell under the de minimis rule and was not considered.

In the Mt. Clemens plant involved, the evidence showed that walking time from the time clocks to the employees' places of work ranged from 30 sec to 3 min, with distances varying from 130 ft to 890 ft. In addition there were certain make-ready operations involved, including such preliminary duties as putting on overalls, removing shirts, taping or greasing arms, preparing the equipment for productive work, sharpening tools, and the like. These latter activities consumed, it was claimed, 3 or 4 min at the most.

The Supreme Court therefore remanded the case to the lower court for a determination of the amounts involved. The union apparently feels that the walking times involved in the case of steel companies are long enough to warrant consideration under the Mt. Clemens ruling.

On the other hand some observers are inclined to believe that the union may prefer to use the size of the potential claim and the difficulties involved in settling it as a basis for negotiations in the wage discussions which it will open with the steelmakers early next year. A clearer statement of the union position may be forthcoming following its policy meeting with the district leaders in mid-December.

Weekly Gallup Polls . . .

Postwar Discontentment Found in U. S. and Britain

Princeton, N. J.

• • • **The tendency** of the public to suffer dissatisfaction in the present postwar period is by no means confined to the United States.

In this country at the present time nearly three out of every four interviewed on the question say they are having a harder time getting along now than they did a year ago — a complaint aimed at sharply increased living costs brought on by shortages, labor troubles, the collapse of price controls, etc., according to George Gallup, director, American Institute of Public Opinion.

But, an analogous situation also exists in Britain. There, the British Institute of Public Opinion in the late summer had field reporters in all parts of England ask the man-on-the-street:

"On the whole, do you think that you are better off or worse off than you were before the war?"

	Pct
Better off	27
Same	23
Worse off	47
Undecided	3

In the United States, field reporters asked this question, obtaining replies in the period just before election time:

"Compared with last year, are you finding it harder, easier, or about the same to make both ends meet?"

The replies of those included in the survey:

	Pct
Finding it harder to make ends meet	71
Finding it about same	21
Finding it easier to make ends meet	6
Undecided	2

Observers may read into both British and U. S. figures on how people reply to the above questions part of the answer as to why elections here and in England turned out as they did.

Something of what is happening in Britain during the present period is to be found in replies to the following questions, keeping in mind that the present Labor Government was swept into power not many months back in a stunning upset:

(1) "In general, do you approve or disapprove of the government's record to date?"

	Pct
Approve	46
Disapprove	41
Don't know	13

Thus, at the present time, nearly as many disapprove of the job the Labor Government has done so far as approve it—a division of sentiment which can very well be carrying the seeds of trouble for the Labor Government in the future.

(2) "Do you think that we shall or shall not have a Conservative Government in Britain within 5 yr? Within 10 yr?"

Replies on 5 yr:

	Pct
Yes	29
No	48
Undecided	23

Replies on 10 yr:

	Pct
Yes	46
No	24
Undecided	30

The results of question two undoubtedly represent a cross between wishful thinking among those hoping for a change in government, and a realization among others of the inevitability of shifting tides in political sentiment with the passage of time. It would appear to indicate that at least some people think they hear a bell already dimly tolling for the Labor Government in England.

U. S. Political Tide Turned In Second Week of September, National Survey Indicates

o o o

• • • **The decisive shift** in political sentiment this year in the U. S. started in the second week of September.

Polling by the institute up to that time found the two parties fairly evenly matched in terms of the congressional races. Then a sharp drop in Democratic strength was registered in the poll balloting beginning Sept. 12. It reflected an accumulation of public discontent over many things, with the meat shortage and the Wallace affair undoubtedly hastening the turn.

The sweeping extent of the Republican congressional landslide was accurately foretold by the institute which predicted that Republican candidates for the House would poll a total of 58 pct, and Democrats 42 pct. Unofficial returns indicate that this prediction came within 2 pct of perfect accuracy.

The shift of sentiment toward the GOP took place in virtually all economic levels and geographical areas outside the South.

One of the most notable aspects of the election is the pronounced trend away from the Democrats in metropolitan areas. The big cities used to be a major source of New Deal voting strength. But in this year's election the returns indicate that the vote of the big cities is more like the vote of the rest of the country than at any time since 1936.

ON THEIR WAY: *Molten pig iron being transferred in ladle cars from blast furnaces to openhearths at the Steel Co. of Canada, Ltd.*

o o o

By F. SANDERSON
Canadian Contributing Editor

o o o

Canadian Steel Industry Looks Ahead to Self-Sufficiency

Toronto

• • • **Canada's industrial expansion,** and especially that branch associated with the iron and steel industry, made greater strides in the past 6 yr, than in any former 25-yr period, While the enlargement of iron and steelmaking facilities was of vital importance toward supplying the greatly multiplied demand for the making of war materials, this increased capacity becomes a very important link in Canada's future industrial activities. Whereas previous to 1940, this country held only a minor position as a manufacturing and exporting nation, today it is rated third or fourth greatest industrial country of the world.

In 1939 Canadian steel mills had a rated capacity of 2,346,000 net tons per yr and since that time this has been increased by approximately 1,000,000 tons, while pig iron production capacity has been almost doubled. Not only has production capacity for iron and steel been substantially increased, but Canada holds the enviable position of having available within its own boundaries, the raw materials necessary to feeding the blast furnaces and steel mills. While it is a fact that most of the iron ore produced in Canada is exported to the United States, it is estimated that within the next year or two output from the Steep Rock Mines and the New Helen Mines will be equal to the entire requirements of this country's enlarged demand. However, until such time as other huge iron ore deposits in Canada come under development, consumers on this side of the border will continue to draw the greater part of their iron ore from the United States.

Development of the iron ore deposits in this country is in its infancy and it is not expected that any real strides will be made in this direction for another 10 to 15 yr when new sources will have to be opened up as replacements to waning supplies of high grade ore from the States. Insofar as potential mineral deposits, especially iron ore, are concerned, Canada ranks at the peak of world nations. With the exception of the Helen mine and a few other small operations that were in production about 30 yr ago and were closed down when the easily available ore ran out, no iron ore was produced by Canadian mines until 1942 when Algoma Steel Corp. brought its New Helen Mine into production. This was followed by the Steep Rock Iron Mines. Previous to 1942 steel companies on this side of the border depended on the United States and Newfoundland for their iron ore supply. But this condition has changed and in the not long distant future there is every chance that Canadian steel mills will obtain all their raw materials within the Dominion.

While Canada's iron and steel industry may appear quite insignificant as compared with that of the United States, on a per capita basis they are about equal. Previous to the war Canada depended largely on the United States for its better and larger lines of steel such as sheets for the automotive industry and other consumers that required highly finished materials, heavy structural shapes, steel plate and practically all specialty steels. However, with the new in-

stallations made at steel plants in this country during the war years, Canada is in a position to take care of its entire steel requirements and imports soon will be confined to those special lines not yet produced here.

Previous to 1940 approximately 30 pct of the steel used in Canada was imported either from the United States or Great Britain. During the war years imports were confined to supplies from the States and ranged from 1,000,000 to 1,500,000 tons a yr, and in the closing years of the war and through 1945-46, they were estimated at 1,000,000 tons or about one-third of requirements. The very substantial additions to steelmaking capacity will not only take care of domestic requirements, but will leave a large surplus to be disposed of in the export markets.

Canada was a large contributor to lend-lease during the war period and efforts in this direction went a long way toward proving the country's status as a manufacturing and exporting country. Following the end of the war, Canadian industry realizing the importance of the machine it had built up and planning to take full advantage of new opportunities made a strong bid for business in the export markets. To a large extent this endeavor was fruitful, and orders amounting to millions of dollars were placed in Canada for locomotives, rolling stock, electrical equipment and innumerable other articles from various European countries, Russia, China, South American countries and the British Dominions.

Great Britain also entered the Canadian market on a large scale, but its demands centered largely on steel and base metals. but with the excessive domestic demand British requirements are being only partially filled. Canada's postwar program to be carried out over the next several years, undoubtedly will see many changes, changes that eventually will establish industry on a strong footing in the export markets of the world.

Industrial activities and reconversion from war to peace, received a severe setback as a result of the steel strike which tied up operations at the three big basic steel mills for 2½ months. This strike not only resulted in a loss in steel production of approximately 450,000 tons, but it threw the postwar program back at least 6 months. While the country gradually is recovering from the effects of the strike insofar as iron and steel production is concerned it is not expected that output will return to a normal basis until the beginning of 1947.

In the middle of July when the strike was called, Canadian steel mills were swamped with orders and some mills had withdrawn from the market on some materials reporting that books were filled to the end of the year. At the end of the strike steel companies resumed operations with backlogs more than sufficient to absorb all output to the year end and on some lines through the first quarter. While consumers have been persistent in their endeavor to place additional large tonnage orders on producers' books, the latter are not interested and in most instances are refusing further commitments until such time as they can see some light with regard to delivery. Officials of various Canadian steel companies are quite optimistic in their statements regarding the future and are predicting that it may take 2 yr before normal conditions return and supply and demand are on a more equal basis.

While there are still some problems to be ironed out between the employers and labor in the steel industry, it is generally believed that labor troubles have been settled for some time to come. Canada has some advantages over the United States in that it has retained price ceilings of numerous articles with the result that the cost of living remains well below that prevailing across the border. While actual wages of steel workers in the Dominion are well below those paid in the States, other compensating factors such as a very much lower cost of living, tend to create more stability and the wage increases in Canada are considered ample to take care of increased living costs. The Canadian gvoernment has made it clear that it is not the intention to drop ceilings and controls and permit runaway prices.

With the steel strike out of the way, Canadian iron and steel producers have laid plans for substantially increased output. Delayed plans for further additions to the plant of Steel Co. of Canada Ltd., Hamilton, representing an expenditure of approximately $10,000,000 are proceeding. Algoma Steel Corp. and Dominion Steel & Coat Co. have not announced any program for further enlargements of their plants. With regard to steel specialties, Canadian mills consider the necessary equipment too costly to justify the expenditure with the limited demand and with supplies easily available from the United States producers.

Canadian steel producers during the war years expended on plant and equipment, approximately $125,000,000 and entered the postwar period with sufficient capacity to meet practically all domestic demands and have a surplus for export. All this new equipment now is available to provide steel, and total capacity is considerably in excess of any previous peacetime period.

The following table presents the growth of Canada's steel ingot capacity and production from 1936 to 1946: All figures are in thousands of net tons.

	Steel Ingot Capacity (Thousands of Net Tons)	Steel Ingot Output (Thousands of Net Tons)	Per Cent of Capacity
1936....	2,346	1,211	51.6
1937....	2,346	1,497	63.7
1938....	2,346	1,238	52.7
1939....	2,346	1,266	53.9
1940....	2,667	2,178	81.6
1941....	2,964	2,578	86.9
1942....	3,172	2,943	92.7
1943....	3,258	2,848	87.4
1944....	3,338	2,878	86.2
1945....	3,359	2,747	81.7
1946*...	2,520	1,688	67.0

*The production figures for 1946 cover only the first 9 months of the year.

In 1936 Canada had a total of 10 blast furnaces, with total rated capacity of 1,450,875 net tons a yr and there was no change in this rate until September 1941 when the Steel Co. of Canada, Hamilton, completed and blew in a new blast furnace with rated capacity of 310,250 tons a yr; in April 1942 Canadian Furnace Ltd., Port Colborne, Ontario, completed and blew in a new furnace increasing its rated capacity by 54,760 tons a yr; in July 1943, Dominion Steel & Coal Co., Sydney, N. S., completed and blew in a furnace to increase its capacity by approximately 225,000 tons a yr and in September 1943 the Algoma Steel Corp. installed and blew in a new blast furnace to boost its rated capacity

Name of Company	Location of Furnaces	No. of Stacks	Total Annual Capacity Net Tons
Dominion Steel & Coal	Sydney, N. S.	4	730,000
Canadian Furnace Co. Ltd.	Port Colborne	2	221,760
Steel Co. of Canada	Hamilton, Ont.	3	757,000
Algoma Steel Corp.	Sault Ste. Marie	5	1,062,000
		14	2,770,760

410,000 tons a yr. No further changes have since been made to blast furnace capacity in this country which now totals 14 furnaces with total rated output of 2,770,760 net tons a yr. Blast furnaces in Canada are located as shown in the table above:

Following are comparative blast furnace capacity and production figures in thousands of net tons 1936-46 inclusive:

	Blast Furnace Capacity	Pig Iron Output	Pct of Capacity
1936....	1,451	760	52.3
1937....	1,451	1,007	69.3
1938....	1,451	790	54.4
1939....	1,451	846	58.3
1940....	1,451	1,309	90.2
1941....	1,816	1,528	84.1
1942....	2,123	1,975	93.0
1943....	2,756	1,758	63.7
1944....	2,771	1,853	66.8
1945....	2,771	1,778	64.1
1946*...	2,078	1,032	49.6

*1946 production figures cover the first 9 months of the year.

Shipbreakers' Profit Hopes Dim As Towing and Labor Costs Skyrocket

By JOHN ANTHONY
Eastern Regional Editor

Philadelphia

• • • **Shipbreakers are** learning that there is no profit in their operations today at the prices at which vessels are being disposed of under competitive bidding. One large shipbreaker who bought cargo carriers at $15,000 to $20,000 each would now be unwilling to pay more than $10,000 to $15,000 for similar vessels. The high prices are believed to be due largely to the number of newcomers in the field who are inclined to overlook some significant cost factors.

Towing costs are up 300 pct over 10 yr ago. One shipbreaker states that the prewar cost of towing from New York around Cape Charles, Va., and up the Chesapeake Bay to the Patapsco River at Baltimore was $1500. Now the cost of towing from the James River at the entrance to the Chesapeake to Baltimore is $2500.

Labor cost is another factor causing current shipbreaking operations to lack interest. Wages are well in excess of prewar experience and the productivity of labor is estimated to be only half the prewar rate. Shipbreakers attribute the low productivity to inexperienced workers, coupled with a lack of interest in the business and the effects of union activity.

Most shipbreakers are still awaiting certain items of equipment to permit large-scale operations to proceed. Required equipment is generally one or more alligator shears or a large crane. Labor is plentiful but it is difficult to obtain a sufficiently large number of experienced men.

Although the industry had originally based its calculations for the total number of Maritime Commission vessels to be released for scrapping at 3500, more recent announcements by the Commission have indicated that a total of some 1300 vessels may be expected from this source. Assuming an average deadweight tonnage of 10,000, total shipbreaking activity during the next few years on Commission vessels should result in 3 to 4 million tons of scrap.

Bethlehem's Fairfield shipyard at Baltimore is producing scrap at the rate of 10,000 tons per month. It is expected that this production will be doubled by January when all equipment will be installed. At the present time the working force is being built up and 100 to 150 additional men will be put on by that time.

The North American Smelting Co. at Philadelphia is a large factor in the industry. A subsidiary, the Ship Shape Corp., Bordentown, N. J., takes title to the vessels but the scrapping operations are handled by the Doan Salvage Co. of Bordentown, a subsidiary. This is a new project and equipment is still being assembled. The company has on hand ten destroyers and destroyer escorts, five cargo carriers and several miscellaneous vessels. Doan expects to produce scrap at the rate of 30,000 tons per month. The North American Smelting Co. has contracted with the Quaker City Iron Works of Philadelphia to have a number of submarines cut up for them.

The Maritime Commission expects to put up for bidding some 60 to 70 cargo carriers having an average deadweight tonnage of 10,000 tons. Scrap realization for such vessels is 3000 tons each. Overall tonnage for the lot will be 180,000 to 210,000 tons of scrap. However, it should be borne in mind that the shipbreaking industry is not yet equipped and manned for maximum production and there must be a time lag between awards and scrap production.

Coming Events

Nov. 14-15 National Metal Trades Assn., convention, New York.
Nov. 14-15 Steel Products Warehouse Assn., Inc., convention, Detroit.
Nov. 15-24 National Aircraft Show, first annual exposition, Cleveland.
Nov. 17-22 American Welding Society, Atlantic City, N. J.
Nov. 18-22 National Metal Congress and Exposition, Atlantic City, N. J.
Nov. 22-23 American Zinc Institute, Galvanizers Committee, Chicago.
Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.
Dec. 2-7 National Power Show, New York.
Dec. 5-7 Electronic Microscope Society of America and American Society for X-ray & Electron Diffraction, joint meeting, Pittsburgh.
Dec. 5-7 Electric Furnace Steel Committee of Iron & Steel Div., American Institute of Mining & Metallurgical Engineers, annual conference, Pittsburgh.
Dec. 9-11 Society for Experimental Stress Analysis, New York.

The London ECONOMIST

Is a Slump Coming?

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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AMERICAN business is currently operating at a new high level of activity. Income payments are at an annual rate of about $170 billion, which is a higher level than was attained at any time during the war and just about double the level in 1929. Total employment exceeds 58 million persons. This is a level regarded only a short time ago as an optimistic target to be reached after several years of postwar readjustment. By these two measures, which are now generally regarded the world over as the basic tests of economic and social attainment, the United States has achieved brilliant success at a surprisingly early stage of the postwar period.

But despite this success and these high levels, marked apprehension exists about the economic health of the country and its near-term, as well as its long-term, prospects. The abrupt disappearance of 22 pct of the quoted values of American corporations in the violent stock market decline has jarred even the hopeful. And it has seemed to reaffirm the fears of those who were already feeling pessimistic.

The state of American economic health at this critical juncture in the world's development needs the closest possible examination. Perhaps the simplest clinical procedure is to make a list of the bases for apprehension and then to set it against a list of the evidences of good health. A comparison of the two groups of items may make possible at least some tentative conclusion.

WHAT, then, are the ailments which afflict the American economy? There seem to be nine.

(1) Major wars have historically produced maladjustments in the American economy which have shortly led to declines in income, employment and trade. Since World War II was the longest period of hostility in which the United States has ever been involved (if one counts the period of economic involvement as starting somewhat prior to Pearl Harbor, there is a considerable pragmatic basis for expecting a decline of some proportions before long.

(2) Business cycle analysis, of which Americans are more fond than any other citizens on earth, points in the same direction. The war boom has lasted longer and reached higher levels than any other boom period in the country's history. Furthermore, intensive study of business cycles discloses that a large number of statistical indices have, over many decades, regularly and reliably signaled declines in business well in advance; almost without exception these indices have called a turn in the course of recent months.

Particularly reliable have been a group of financial items, including a turn up in interest rates, and turn downs of security issues and bank investments. The interest rate, as measured by the yield on long-terms government securities, to a current level of about 2.37 pct; and many short-term rates have been marked up slightly. Investments of the member banks of the Federal Reserve system (that is, all the larger commercial banks in the country) have declined by more than $10 billion since the beginning of the year, while the volume of new security issues has declined precipitately under the impact of the stock market decline.

The second significant group of hitherto reliable signals is a number of series on building, and these too—unquestionably because of very high prices and material shortages, but not because of any deficiency in demand—have recently turned downward. The last in this group of signals is the violent decline in the stock market. The effect of falling stock prices is—or has hitherto been—to impair the ability of business to finance its capital requirements and to curtail the spending power of investors.

If the previous familiar pattern prevails, the changes in these financial, construction and stock market series will in due course be followed by declines in commodity prices and business activity. Already there are perceptible signs of weakness among commodity prices. Three recent surveys of opinion among business economists have agreed in expecting the peak of the price curve to come this year or next, with the decline to follow.

(3) In a number of areas there are evidences of a lack of balance which may, many fear, cause a toppling over and decline of business. First, the cost of production has risen rapidly over a number of years, and seems to have outrun prices. For example average hourly pay of factory employees has risen from 80¢ an hr at the beginning of 1942 to $1.10 an hr currently—with further increases in prospect. Apparently no equivalent improvement has occurred in the ability of each worker to produce goods. This increase of nearly 40 pct contrasts with a rise of only about 20 pct in the wholesale prices of all commodities other than farm products and foods. Clearly a basic alteration has occurred in the relationship of cost of production to selling price. This burdens enterprise, new investment and employment. The attractiveness of starting new business enterprise is diminished, as is demonstrated by the decline in new incorporations since the start of the year.

Secondly, the price rise which has ensued from this condition

[CONTINUED ON PAGE 195]

T. L. KANE

R. M. GIBBS

T. W. LIPPERT

The Iron Age Announces Staff Changes

New York

• • • **Thomas L. Kane has** been appointed publisher of THE IRON AGE, succeeding John H. Van Deventer, who has resigned. Mr. Kane has been and will continue to be publisher of *The Spectator*. He is director of the Chilton Co., parent organization of the two magazines.

R. M. Gibbs has been made business manager of THE IRON AGE, succeeding C. S. Baur, who has resigned. Just prior to assuming his new position, Mr. Gibbs was assistant to the president and before that time was Pittsburgh regional manager for THE IRON AGE.

T. W. Lippert has been appointed directing editor of THE IRON AGE. He was previously editor and has been with the paper for the past 14 yr in various editorial capacities.

U.S. Surplus Aircraft Infuse New Strength To Foreign Airlines

Paris

• • • **The growth of worldwide** air transportation network, stunted by diversion of plane production for war, is rapidly being put back on schedule by transfusion of thousands of American air transports sold off as surplus to the postwar needs of the U. S. Army and Navy.

Now flying the spider web of commercial and government airlines strung around the globe are the fleets of Skymasters, Skytroopers, C-47's, flying boats and smaller passenger craft which formerly shuttled Allied troops and supplies to the battlefields of the world.

By far the largest buyer was the United Kingdom which purchased and leased a total of 1387 planes for operation in home airlines and in her overseas possessions. In India, the government, commercial lines and individuals, including nine maharajahs, bought 411 craft of all types ranging down from C-53 airliners to grasshopper L-4's used by the Army mainly as artillery spotters.

Other volume buyers were Czechoslovakia, 425 planes; France, 359; Australia, 237; Holland, 190; Philippines, 128; and Canada, 124. However, indicating the wide distribution of the planes the report also showed sales to airlines and individuals in such countries as Costa Rica, Haiti, Egypt, Ethiopia, Mozambique, Eire, Nicaragua and Burma.

Return to the U. S. taxpayer from outright sales has topped the $47,000,000 mark in addition to $4,200,000 annually for leased craft. Considered equally important with the cast return is the future sales potential resulting from present use of U. S. planes by new and expanding foreign airlines.

The report pointed out that equipment has been supplied partially or wholly from surplus American craft for substantially every country in the world where commercial airlines are operating. Original cost of 4206 craft sold was $364,031,394, comprising all planes declared surplus to overseas OFLC offices, those declared to the War Assets Administration in the U. S. and those returned from lend-lease by foreign governments.

The predominance at European air terminals today of Skymasters, C-47's and other familiar American transport planes, now carrying the colors of more than a dozen European airlines, is reflected in the sales of surplus aircraft in this area.

In all, European governments, airlines and individuals bought over 3000 craft of all types, more than half the worldwide total. Included were 1700 C-47 type transports which now are lacing up the cities of Europe. North Africa and the Near East with a network of feeder lines.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1946

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
February	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st Quarter	*10,775,732*	*53.8*	*597,366*	*47.0*	*398,520*	*29.4*	*11,771,618*	*51.9*	*915,367*	*12.86*
April	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd Quarter	*14,178,712*	*69.9*	*690,750*	*53.7*	*688,074*	*50.1*	*15,557,536*	*67.9*	*1,195,814*	*13.01*
1st 6 months	*24,954,444*	*61.9*	*1,288,116*	*50.4*	*1,086,594*	*39.8*	*27,329,154*	*59.9*	*1,056,403*	*25.87*
July	6,016,253	87.4	365,332	83.6	228,083	48.9	6,609,668	84.9	1,495,400	4.42
August	6,251,271	90.6	373,837	85.4	261,755	56.0	6,886,863	88.2	1,554,597	4.43
* September	5,911,375	88.6	371,465	87.8	235,054	52.1	6,517,894	86.4	1,522,872	4.28
* *3rd Quarter*	*18,178,899*	*88.9*	*1,110,634*	*85.6*	*724,892*	*52.3*	*20,014,425*	*86.5*	*1,524,328*	*13.13*
* *9 months*	*43,133,343*	*71.0*	*2,398,750*	*62.2*	*1,811,486*	*44.0*	*47,343,579*	*68.9*	*1,213,938*	*39.00*
† October	6,344,089	91.9	387,933	88.6	238,213	51.0	6,970,235	89.3	1,573,416	4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1945

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	*Net tons	*Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity		
January	6,469,340	90.5	379,062	76.0	355,910	76.8	7,204,312	88.8	1,626,256	4.43
February	5,968,326	92.4	347,227	77.1	337,212	80.6	6,652,765	90.8	1,663,191	4.00
March	6,927,939	96.9	398,351	79.8	379,639	81.9	7,705,929	95.0	1,739,487	4.43
1st Quarter	*19,365,605*	*93.3*	*1,124,640*	*77.6*	*1,072,761*	*79.7*	*21,563,006*	*91.5*	*1,676,750*	*12.86*
April	6,541,627	94.5	372,952	77.2	375,308	83.6	7,289,887	92.8	1,699,274	4.29
May	6,664,117	93.2	402,100	80.6	383,450	82.7	7,449,667	91.8	1,681,640	4.43
June	6,129,763	88.5	379,807	78.6	330,952	73.7	6,840,522	87.1	1,594,527	4.29
2nd Quarter	*19,335,507*	*92.1*	*1,154,859*	*78.8*	*1,089,710*	*80.0*	*21,580,076*	*90.6*	*1,658,730*	*13.01*
1st 6 Months	*38,701,112*	*92.7*	*2,279,499*	*78.2*	*2,162,471*	*79.9*	*43,143,082*	*91.0*	*1,667,688*	*25.87*
July	6,318,975	88.6	381,832	76.7	284,764	61.6	6,985,571	86.3	1,580,446	4.42
August	5,172,344	72.3	347,088	69.5	215,885	46.6	5,735,317	70.7	1,294,654	4.43
September	5,435,799	78.7	352,847	73.2	193,829	43.3	5,982,475	76.3	1,397,775	4.28
3rd Quarter	*16,927,118*	*79.9*	*1,081,767*	*73.1*	*694,478*	*50.5*	*18,703,363*	*77.8*	*1,424,475*	*13.13*
9 months	*55,628,230*	*88.4*	*3,361,266*	*76.5*	*2,856,949*	*70.0*	*61,846,445*	*86.6*	*1,585,806*	*39.00*
October	5,146,787	72.0	242,122	48.5	207,867	44.8	5,596,776	69.0	1,263,381	4.43
November	5,641,308	81.5	358,664	74.2	200,494	44.7	6,200,466	78.9	1,445,330	4.29
December	5,523,277	77.4	343,266	68.9	191,394	41.4	6,057,937	74.8	1,370,574	4.42
4th Quarter	*16,311,372*	*76.9*	*944,052*	*63.8*	*599,755*	*43.6*	*17,855,179*	*74.2*	*1,358,842*	*13.14*
2nd 6 months	*33,238,490*	*78.4*	*2,025,819*	*68.5*	*1,294,233*	*47.1*	*36,558,542*	*76.0*	*1,391,646*	*26.27*
Total	71,939,602	85.5	4,305,318	73.3	3,456,704	63.4	79,701,624	83.5	1,528,608	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,614,338 net tons open hearth, 112,658 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,636 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 84,171,590 net tons, Bessemer 5,874,000 net tons, Electric 5,455,890 net tons, total 95,501,480 net tons.

*Revised January through December, 1945.

Industrial Briefs...

• NEW LURIA OFFICE — A branch office has been opened at Birmingham by Luria Bros. & Co., Inc., whose home office is in Philadelphia, and whose primary business is the purchase and sale of scrap iron and steel.

• SMOKE PREVENTION BOOK—All the technical, as well as the general papers presented at the 1946 Conference of the Smoke Prevention Association, Inc. (an organization of smoke inspectors for municipalities) are published in the new book "Proceedings of the 1946 Smoke Prevention Conference." It contains up-to-date and authoritative information on practical methods of preventing smoke. Each paper was written by an authority in the field—and also contains discussion of each subject by experts present at the conference. Priced at $2.00, orders should go to John Paul Taylor, Publisher, 520 Pleasant St., St. Joseph, Mich.

• SWITCHBOARD OUTPUT — The Western Electric Co. has begun production of switchboard cables and magnet wire in the Kenmore Ave., Buffalo, plant, formerly occupied by the Curtiss-Wright Corp. The company has about 200 on the payroll, nearly half of them women, and expects to reach 500 by January. Another 2000 are expected to be employed in 1947. Installation of machinery is progressing, with some of the equipment being moved here for the Kearny, N. J., and Chicago plants of the company.

• TO REPRESENT — The Alloy Casting Co., Champaign, Ill., announces the appointment of A. C. Woolley, of the Woolley Instrument Service Co., as northwestern representative in the sale of their stainless steel and heat resistant castings.

• MORE ACID—E. I. du Pont de Nemours & Co., Inc., is further expanding its plant at the Grasselli division in East Chicago, Ind. This plant, producing principally sulphuric acid, was substantially enlarged during the war but has been found to be incapable of meeting present peacetime demand.

• NORTON BUYS BUSINESS—Norton Co., Worcester, has purchased the assets of the Oslund Brothers Machine Co., manufacturers of bottle labeling machinery. The business will be housed in the Norton Co. New Bond St. plant and operated by the company's machine division.

• MEXICO CASTINGS PLANT—Central Pattern & Foundry Co., Chicago, is planning construction of an aluminum castings plant 8 miles from Mexico City. The factory, which will be the company's third, is to cost $150,000 to $200,000, and will be 200 ft long and 100 ft wide. The company, which will change its name Jan. 1 to Central Aluminum Castings Corp. produces castings for cylinder heads, motor blocks, cooking utensils, vacuum cleaners, vending machines, and X ray equipment.

• UP FOR SALE — War Assets Administration is offering for sale or lease the industrial plant which American Welding & Mfg. Co. leased and operated during the war for the production of tanks and tank parts. Consisting of 17 structures on a 7½-acre land tract, the plant has a reported cost to the government of $619,000.

• HEVI-DUTY EXPANDS — The Hevi-Duty Electric Co., Milwaukee, subsidiary of the North American Co., has purchased a controlling interest in the Surges Electric Co., Milwaukee, and will dissolve the latter firm.

• NEW FOUNDRY—Correct Casting, Inc., has been organized with Fred Kramer as manager, to operate a foundry at Lohrville, Wis., in modernized buildings formerly occupied by a quarry firm.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

15,000 Tons (previously reported 1,500 tons) Schenectady, turbine plant for General Electric Co. to American Bridge Co., Pittsburgh. Stone & Webster Engineering Corp., Boston engineers.

5000 Tons, Lowland, Tenn., industrial plant for American Enka Co. to Virginia Bridge Co., Roanoke, Va. H. K. Ferguson, contractor.

4300 Tons, New York City, Hillside Ave. subway to Bethlehem Steel Co., Bethlehem, Pa.

1400 Tons, San Francisco, addition to general offices of Pacific Gas & Electric Co., through Cahill Brothers, Inc. to Bethlehem Pacific Coast Steel Corp., San Francisco.

1300 Tons, New York City, building addition, Lockwood Green engineers for City of New York to American Bridge Co., Pittsburgh.

650 Tons, Detroit, Ford expressway bridge to Jarvis Engineering Works, Lansing, Mich.

640 Tons, New York, subway extension, City of New York to American Bridge Co., Pittsburgh.

500 Tons, San Mateo Co., Calif., United Air Lines buildings at San Francisco Airport, to Bliss Mill Div., Austin Co., Cleveland.

305 Tons, Clifton, N. J., highway overpasses through Franklin Construction Co. to American Bridge Co., Pittsburgh.

300 Tons, Portsmouth, Ohio, foundry building to Bethlehem Steel Co., Bethlehem, Pa.

145 Tons, Fayreville, N. Y., mill building for Chemical Construction Corp. to American Bridge Co., Pittsburgh.

• • • **Fabricated steel inquiries** this week included the following:

3000 Tons, Venice, Ill., extension to Union Power Co.'s power station. Stone & Webster Engineering Corp., Boston engineers.

2500 Tons, Alexandria, Va., 80,000 kw power plant for Braddock Light & Power Co., Stone & Webster Engineering Corp., Boston engineers.

1000 Tons, Tampa, Fla., power plant for Tampa Power & Light Co. Stone & Webster Engineering Corp., Boston engineers.

700 Tons, Desoto, Mo., car shop for the Missouri & Pacific R.R.

• • • **Reinforcing bar awards** this week included the following:

3000 Tons, Schenectady, turbine plant for General Electric Co. to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston engineers.

1000 Tons, San Mateo Co., Calif., United Air Lines buildings at San Francisco Airport, through the Austin Co., to Judson-Pacific-Murphy Corp.

250 Tons, Chicago, building for Sprague Warner Co. to Trueson Steel Co., Youngstown, Ohio.

205 Tons, Chicago, building for Derby Foods previously reported awarded to George Sollitt Co. Concrete Steel Co., New York, to furnish tonnage.

200 Tons, Chicago, telephone exchange building for Illinois Bell Telephone to J. T. Ryerson & Sons Co., Chicago.

• • • **Reinforcing bar inquiries** this week included the following:

750 Tons, Los Angeles, headworks structure of Hyperion Activated sludge Plant, Los Angeles Board of Public Works, bids open Dec. 4.

250 Tons, Taos Co., N. Mex., grading and bridge on state highway No. 3 between Questa and Taos, State Highway Engineer, Santa Fe.

110 Tons, Mossdale, Calif., bridge across San Joaquin River, California Div. of Highways, Sacramento.

• • • **Sheet piling awards** this week included the following:

2000 Tons, Schenectady, turbine plant for General Electric Co. to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston engineers.

400 Tons, Milwaukee, dock piling for Callum Canning Co. to Carnegie-Illinois Steel.

• • • **Rail awards** this week included the following:

80,200 Tons, by the B & O R.R., standard rails 40,000 tons to Bethlehem Steel Co., 39,200 tons to Carnegie Illinois Steel Co., and 1000 tons to Inland Steel Co.

• • • **Railroad car awards** this week included the following:

Boston & Maine and Maine Central, jointly, have purchased 750 50-ton box cars from Pullman-Standard Car Mfg. Co. Delivery, earliest possible.

CPA Rules Subject Housing-Type Nails To 50 Pct "Set-Aside"

Washington

• • • **CPA has ordered** that 50 pct by weight of each shipment of housing type nails received by suppliers from nail producers be set aside and held indefinitely to fill rated orders. While nails have been on the HH preference rating list of Schedule A to PR-33 for some time, this is the first time that there has been a "set-aside." The action, which was requested by NHA to assist the Veterans' Emergency Housing program, was taken by adding nails to the set-aside list of Schedule B to PR-33.

The nails which are subject to the 50 pct set-aside are housing-type nails defined in Schedule A to PR-33 as "Wire and cut nail 2 penny to 20 penny inclusive; nails and brads smaller than size 2 penny but suitable for roofing, siding, lath or millwork. This does not include size 2 penny to size 10 penny cement or bright box nails."

NHA officials said that the set-aside provision, the recently-approved premium payment plan for nail production, and the leading nail manufacturers' pledge to exert maximum efforts to increase production, will all contribute to the elimination of hoarding or black marketing of nails.

AISC Convention Takes Time Out to Go Fishing

ABOVE

• The *Milanda,* one of the two boats which carried 50 would-be fishermen down to the sea off San Diego on Oct. 29 during the AISC's annual convention. Six fish were caught.

ABOVE

• D. C. Storey, Columbia Steel Co., Los Angeles, left, and D. L. Robertson, Apex Steel Co., Los Angeles, both of whom apparently went along just for the ride.

LEFT

• Ed Foran, left, owner of the sportfishing boat *Kathryn G,* who retired as accountant for American Steel & Wire Co., Cleveland, 3 yr ago after 30 yr with the company. Center foreground, Karl Koch, Jr., Koch Erecting Co., New York. Right, Bob Grover, Apex Steel Co., Los Angeles.

• M. Bassevitch, Standard Structural Steel Co., Hartford, comes ashore after a hard day's work. Mr. Bassevitch was among those whose wives accompanied them on the expedition.

• Murray Altman, left, Acorn Iron Works, Detroit, watches weighing of calico bass which tied with that caught by S. M. McManus, Muskogee Iron Works, Muskogee, Okla. Tom Sennett is at the extreme right.

• R. E. Mattern, right, Concrete Steel Fireproofing Co., Detroit, and in front of him, the day's catch on one boat, three calico bass. The gentleman at the left is unidentified.

MACHINE TOOLS

. . . News and Market Activities

Surplus Sales Booming at Cut Prices

• • • **Sales of government-owned** surplus machine tools have picked up tremendously since War Assets Administration reduced prices, according to reports. Dealers are still showing a good deal of activity, although their commissions are now very low, and one of WAA's regional offices reports that it is some 2500 requests in arrears, which means that 2500 machines will be sold as soon as they are located in any of the various WAA regional warehouses. Half of the sales staff in some offices has been switched from sales to locating machines.

Mail and telephone calls have increased threefold since Oct. 28, but it is apparent that the curious distribution of the surplus is giving regional offices some headaches. The quantity of long-supply items varies with the districts, and items in long supply in one particular place may not be in demand there at all, while a WAA office 1000 miles away may have 200 requests for that particular item.

While WAA anticipates a good business from the rebuilders, a number of machine tool builders who have been in position to pick up some of their own machines have not done so because they feel there is little chance of making any money at it. Most builders will probably await some further price reduction before getting into rebuilding their own machines, and no further reduction in prices is in the offing at the moment. The special machines offer another possibility, and since these are to be sold on a sealed bid basis, some builders will probably make at least an offer.

Despite the surge in surplus sales, some segments of the industry report that business is good. One executive stated that his company sold one-third as many units in the first week of this month as were sold in all of October. At the same time, the armed forces are showing more than a spark of interest in their long rumored strategic reserves. Action will have to be taken rapidly, however, because most of the good units will be sold by WAA in short order.

With the election out of the way, some segments of the industry feel that business will improve. Such confidence is based primarily on current bookings which seem to be running ahead of last month in most sectors. Underlying all of this sales activity is the fact that machine tool builders collectively have not priced themselves out of the postwar market, a situation all too apparent in other industries. Part of this is due to the government-owned surplus, but the major share of the credit must go to the builders themselves, who have been through all this before and know the financial tides about as well as anybody.

According to CPA, shipments of mechanical presses declined 13 pct to $4,100,000 in September from the all-time high of $4,700,000 in August, but were still five times as high as average monthly shipments in 1941. It is expected that the report of October shipments will show a slightly higher level than September. New orders continued to keep pace with production so that the backlog remained at $39,000,000.

However, if the present rate of production continues, according to CPA, some press makers should be able to fill new orders in less than 10 months. Mechanical press industry has done a very good job in increasing production to meet reconversion demands, CPA has pointed out, and in view of its current high rate of production and relatively good position, it has been removed from CPA's critical list.

Another item was added to the machine tool industry's growing postwar product diversification last week when it was revealed that National Acme Co., Cleveland, is producing a bit brace for Sears, Roebuck & Co.

National Acme is making the bit brace in the DPC plant which it purchased from the government a few months ago. The plant, which contains 80,000 sq ft of floor space, housed the company's aircraft wheel and brake program during the war.

Manufacturing facilities within the plant will be expanded, according to company officials, who are contemplating more work of a similar nature. National Acme plans to turn out 5000 bit braces a day in the near future. Production started a month ago, and the initial contract, which is reportedly the "largest in the history of the hand tool industry," runs into astronomical proportions.

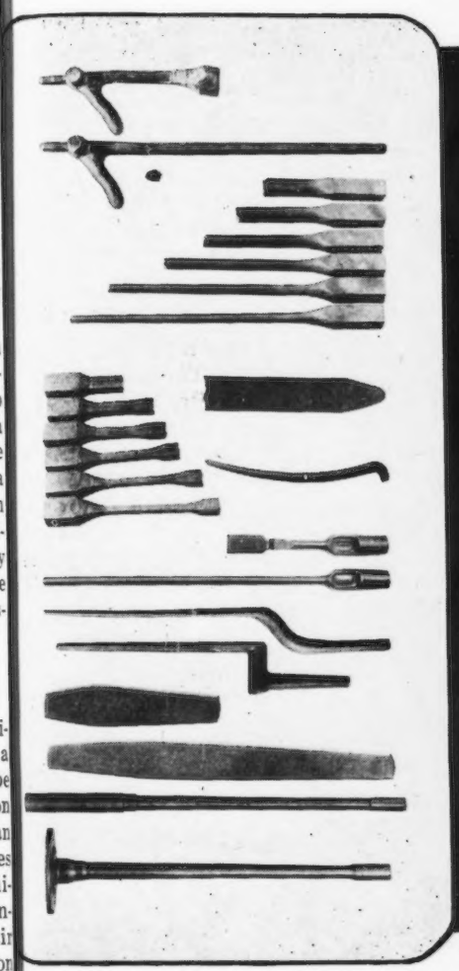
•

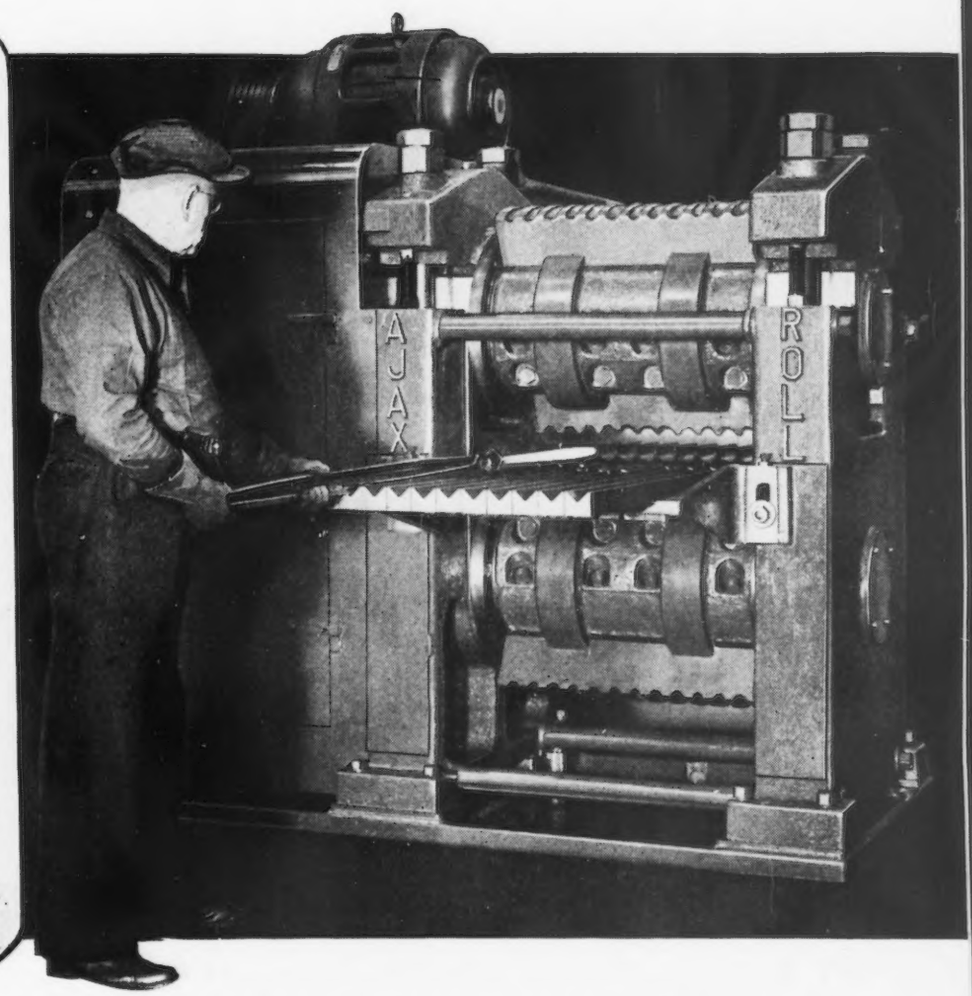
In **Cincinnati,** Howard Engineering & Mfg. Co. is exhibiting a machine designed by them to be used in the production of television equipment. This machine will clean the scale formed on television tubes during casting process. Mechanical gadgets of the machine are contained in a steel boxlike affair measuring 12x9x19 ft. A television tube is placed in a specially designed clamping fixture attached to a transfer arm. There are 12 of these arms and in the process of cleaning the tube, the arm goes through 12 different cycles. Tubes are then put through caustic solution washes, rinsed several times including a final rinse in distilled water and then dried.

These operations are actuated by a timing relay which turns the valves off and on at the prescribed time when a tub, rotating on the turntable containing the arms comes into position over one of the 12 valves. The machine requires only one operator and it is designed to clean 3 sizes of television tubes.

The Howard Company, comparatively new in the Cincinnati industrial field, has designed and built numerous machines for cleaning and finishing metal parts. George M. Howard, president, has spent 18 yr in the automotive engineering field and organized the present company in Cincinnati in 1939.

AJAX WIDE ADJUSTMENT FORGING ROLLS





The Correct Complement to Forging Presses and Upsetters for Efficient Production of Reduced Straight and Tapered Forgings

★For high speed, low cost production of many reduced straight and tapered forgings, wide adjustment forging rolls are of great advantage. These rolls are highly efficient in drawing blanks preparatory to forging in press, hammer or upsetter or for drawing slendor shanks on pieces that have been previously forged.

The operation of Ajax Rolls on blanks of steel, aluminum or magnesium is extremely simple and their production of long, uniform reduced straight or tapered sections from blanks of large cross section is many times that of the fastest swagers or hammers.

Today alert forging shop operators are establishing new records and gaining valuable experience in the most advanced methods of high speed forging production. And tomorrow, when business is more competitive and low cost production takes on greater importance, these same operators who have this modern equipment and valuable experience will be the leaders in the production of Automobile Axle Drive Shafts, Spring Leaves, Cable Bolts, Railroad Brake Levers, Brake Shoe Keys and a large variety of other straight and tapered forgings.

Write for Bulletin No. 91-A

THE AJAX MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND 17, OHIO
110 S. DEARBORN ST. • CHICAGO 3, ILLINOIS
DEWART BUILDING • NEW LONDON, CONN.

NONFERROUS METALS

. . . News and Market Activities

Metals Reserve Will Increase Price of Tin

New York

• • • **The Office of Metals** Reserve, the largest seller of tin in the country, is about to announce an increase in the price of pig tin to 69½¢ or 70¢ per lb. This is an increase from the former domestic ceiling of 52¢. The present world price as determined by the British export price and the price of Malay Straits tin is established at 69½¢. The new domestic tin sales price will be in accord with the MR contract buying price with Bolivian tin producers.

It is understood that CPA will continue tin import restrictions so that domestic buyers will not be able to bid up the world price against the action of the government buying agency, Metals Reserve. The international combined tin committee which sits in Washington and is composed of representatives of producing and buying nations will continue to allocate tonnage of available tin resources to consuming nations.

No word has yet been received on the results of the secret meeting of the International Tin Committee which is the old cartel whose objective was to form and stabilize the tin market.

•

Copper at World Price

New York

• • • **The first announcement** of a price increase on copper has been made by the Kennecott Copper Co., effective Nov. 12. The price was established at 17½¢ for standard shapes delivered to the Connecticut Valley. This price compares with the former ceiling price of 14.375¢ and is identical with the recognized world market price.

It is understood that the Office of Metals Reserve will continue to purchase a supplemental supply abroad in order to meet the needs of domestic consumers.

All copper producers' executive offices were closed on Monday and therefore no other producer had announced its price increase early Tuesday. It is assumed that Kennecott's action will be followed by all other producers.

•

Antimony Price Increased

Laredo, Tex.

• • • **The Texas Smelting & Refining** Co. has announced a price increase effective Nov. 12 for domestic antimony. The RMM brand, in bulk, f.o.b. Laredo, Tex., has increased in price to 23.50¢ per lb. In cases there is an additional charge of ⅜¢ per lb. This grade contains 95.50 pct antimony. The new price is equivalent to the reported world price. There is no importation of the Chinese antimony on which the country's consumers were dependent in prewar days.

•

Zinc at 10½¢ E. St. Louis

New York

• • • **The American Zinc,** Lead & Smelting Co. announces that effective Nov. 11 its price of Prime Western slab zinc is 10.50¢ per lb East St. Louis, Ill., basis. The usual premiums will apply on Select, Brass Special, Intermediate, High Grade, and Special High Grade.

Howard I. Young, president, stated that it is recognized that this price is below the world price when duty is taken into consideration. It is hoped, however, that this price will bring into this country sufficient zinc, either in the form of slabs or recoverable zinc in concentrates, to make up the deficiency between the current production of zinc from domestic mines and the actual consumption, which is estimated to be 300,000 tons of recoverable metallic zinc annually.

•

Lead Up to 10½¢ New York

New York

• • • **The St. Joseph** Lead Co. has announced a price increase for common lead to 10.50¢ per lb at New York, 10.35¢ at St. Louis. The usual premiums apply to all grades. This increase represents an increase of 2¼¢ over the former OPA ceiling. The current price compares with an import price of 11.60¢ c. i. f. New York, duty paid.

The Premium Price Plan continues in effect under the law until June 30, 1947 but many subsidized lead producers will be dropped out of the program due to the price increase. It is believed that those mines which were receiving only the "A" premium payments will now be without subsidy. The Premium Plan provides that the subsidy be reached to the extent that the base metal price is increased.

•

Canada Retains Ceilings

Toronto

• • • **From reliable** sources it is learned that Canadian copper producers, working together, have entered into an agreement whereby the British Ministry of Supply will purchase through the coming year 75 pct of Canada's exportable surplus of refined electrolytic copper. The price arrangement assures producers of 17.5¢ a lb f.a.s. Canadian Atlantic ports for 25 pct of the sales and the remainder to be fixed by market prices and by agreement. The impending British price compares with the Canadian ceiling of 11.5¢ delivered Toronto or Montreal.

Rumors were circulated in Canada during the week to the effect that ceiling prices on base metals were to be lifted but these rumors were promptly denied by the Nonferrous Metals Control Office at Ottawa.

Nonferrous Metals Prices

Cents per pound

	Nov. 6	Nov. 7	Nov. 8	Nov. 9	Nov. 11	Nov. 12
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	17.50
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	17.50
Tin, Straits, New York	52.00	52.00	52.00	....	52.00	69½-70
Zinc, East St. Louis	9.25	9.25	9.25	9.25	10.50	10.50
Lead, St. Louis	8.10	8.10	8.10	8.10	10.35	10.35

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	23.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$30.00
Cadmium, del'd	$1.25
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	17.50
Copper, electro, New York	17.25
Copper, lake, Conn. Valley	17.50
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz	$ 2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	$10.35
Lead, New York	$10.50
Magnesium, 99.8 + %, carlots	20.50
Magnesium, sticks, carlots	26.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$96 to $98
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	90 125
Tin, Straits, New York	69.50 to 70.00
Zinc, East St. Louis	$10.50
Zinc, New York	$10.94
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	14.25
Piston alloys, No. 122	14.50 to 14.75
AXS 679	14.75
Aluminum, deoxidizing No. 4	13.00 to 13.50
Brass Ingot—ceiling prices	
85-5-5-5 (No. 115)	15.75
88-10-2 (No. 215)	19.00
80-10-10 (No. 305)	18.50
No. 1 Yellow (No. 405)	12.75

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	....	25.81
Copper, H.R.	....	22.16	....
Copper drawn	....	23.16	....
Low brass, 80%	....	24.35	24.66
High brass	....	....	23.67
Red brass, 85%	....	24.67	24.98
Naval brass	23.84	22.59	28.53
Brass, free cut	....	18.53	....
Commercial, bronze	....	25.50	25.81
Manganese bronze	27.45	25.95	32.03
Phosphor bronze, A, B, 5%	....	43.70	43.45
Muntz metal	23.59	22.34	26.78
Everdur, Herculoy, Olympic or equal	....	29.82	30.88
Nickel silver, 5%	....	34.44	32.38
Architectural bronze	22.50	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢, 52S-O, 67¢ 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 25¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢ 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

(Continued. See Next Column)

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

NONFERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloys

Group 1

No. 1 wire, No. 1 heavy copper	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable	....*
Lead covered telephone, power cable	7.54
Insulated copper	....*

Group 2

Bell metal	17.25
High grade bronze gears	15.00
High grade bronze solids	....*
Low lead bronze borings	....*
Babbitt lined brass bushings	14.75
High lead bronze solids	....*
High lead bronze borings	....*
Red trolley wheels	12.50
Tinny (phosphor bronze) borings	12.25
Tinny (phosphor bronze) solids	12.25
Copper-nickel solids and borings	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition)	10.75
Soft red brass borings (No. 1)	10.75*
Gilding metal turnings	10.25
Contaminated gilded metal solids	10.25
Unlined standard red car boxes	10.00
Lined standard red car boxes	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

Group 3

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.50
Muntz metal condenser tubes	8.00
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.65[1]
Manganese bronze solids	6.65[2]
Manganese bronze borings	6.90

Group 4

Refinery brass	6.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap

Briquetted cartridge brass turnings	10.37½
Cartridge brass turnings, loose	9.62½
Loose yellow brass trimmings	9.62½

Aluminum

Plant scrap, segregated

2S solids	11.00 to 11.50
Dural alloys, solids 14, 17, 18, 24S, 25S	8.50 to 9.00
turnings, dry basis	7.50 to 8.00
Low copper, alloys 51, 52, 61, 63S solids	9.50 to 10.00
turnings, dry basis	8.50 to 9.00

Plant scrap, mixed

Solids	8.50 to 9.00
Turnings, dry basis	7.50

Obsolete scrap

Old sheet and utensils	9.50
Old castings and forgings	8.50 to 9.00
Pistons, free of struts	8.50

Magnesium

Segregated plant scrap

Pure solids and all other solids	8.00¢
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

Zinc

New zinc clippings, trimmings	8.00
Engravers, lithographers plates	8.00
Old zinc scrap	6.50
Unsweated zinc dross	6.55
Die cast slab	6.55
New die cast scrap	5.70
Forming and stamping dies	5.70
Radiator grilles, old and new	5.70
Old die cast scrap	5.25

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.

Soft lead scrap	7.50

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight, delivered	23.72
Curved, 18 in. or longer, delivered	23.72
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	27.25
Zinc, cast, 99.99	17½
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	93⅞

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

. . . News and Market Activities

Hesitancy, Confusion Usher in Free Market

New York

• • • **The changeover** from a controlled scrap market this week to a free market found most buyers and sellers in a confused state of mind but by mid-week the law of supply and demand appeared to be well on its way toward establishing prices somewhat different from those reported under OPA ceilings.

The quoted price of No. 1 heavy melting steel scrap at Pittsburgh had advanced early this week by a range of $5.00 to $5.50 a ton, a net gain of about $2.50. The apparent discrepancy here is of course the fact that most steel scrap buyers had been paying $22.50 a ton for various grades of steel and accepting it as low phos with its consequent $2.50 premium. The spread of 50¢ now appearing in quoted prices takes care of brokerage and similar fees.

Early this week many scrap prices were nominal and the quotations reported represent prices at which consumers would be willing to make transactions. This did not necessarily mean that brokers would be willing to sell at such levels. For that reason, it may take another week before prewar relationships between grades are established and before all the fancy classifications go by the board and the market returns to the days when the sale of No. 1 heavy melting steel meant just what it said and nothing else.

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PITTSBURGH—Confusion surrounding the reinstitution of business on a free market basis last Monday settled down somewhat by late afternoon when Jones & Laughlin and Carnegie-Illinois both had made firm offers of $2.50 a ton over the OPA ceiling prices on all grades of scrap. Up to that time, both dealers and consumers were sitting tight, each waiting for a move from the other. Even with the firm $2.50 offers, there is a definite tendency on the part of the dealer to hold back and see what happens. This $2.50 offer can easily be broken by a better offer but early in the week it seemed that mills would try to hold to that range. Consumers that were screaming for scrap last week seemed content to sit tight for a while to see if the market would hold. No new tonnages of any consequence were being hunted by consumers at any price.

CHICAGO—Going prices on all types of scrap have not yet been clarified and the impending rise in prices has had no immediate effect on the volume of sales. The only immediate effect of the lifting of controls has been a much sharper distinction between grades. Large buyers are concealing the new prices until commitments are sufficiently covered.

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PHILADELPHIA—All contracts between mills and brokers based on OPA price ceilings have expired and must be worked out on a new price basis. The industry is understood to be marking time pending the establishment of an entirely new set of price schedules. Meanwhile it is reported that the market is now openly paying at least the $2.50 granted low phos for No. 1 and No. 2 steel which brings up the price of low phos to $23.75. Cast scrap is reported to be selling at $35 delivered to the foundry.

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DETROIT—Scrap movement in this area came to a virtual halt following the lifting of OPA ceilings and early this week there were few transactions, the largest buyer in the district stating that he would make no offer until Nov. 13. One factor tending to hold the old price line is the existence of reciprocal agreements between scrap sources and steel mills covering significant scrap tonnages. Some sources here believe that November lists may be offered at present ceiling prices. First price breaks are looked for in foundry and furnace grades, part of which at least will only reflect the upgrading that has been common practice for an extended period.

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NEW YORK—Shipments dropped almost to a standstill early this week as dealers and consumers adopted a wait and see attitude on prices. Almost all old contracts were automatically cancelled and information indicates that buyers first steps have been to accept an increase on No. 1 steel of $2.50, plus the $2.50 premium they formerly paid.

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BOSTON—Small distress foundries are running around the trade making fantastic offers for cast. One of $50 a ton has been made. Movement of turnings, boring, No. 2 bundles and busheling is fairly good. A small tonnage of street car rails at ceiling has been sold, buyer to do cutting.

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CLEVELAND—Removal of controls has thrown the scrap market here into complete flux. Wildest buying centers around cast, with the smaller consumers constantly upsetting the applecart. Sources that have been earmarking their scrap for a particular mill are completing their November orders at the old prices, according to reports, and while many in the trade are giving lip service to a $2.50 increase straight across the board, up-grading into item 14 continues unabated.

BUFFALO — The start of the week found dealers with no orders on their books and quite happy about the whole thing. Removal of price limits, of course, terminated contracts based on OPA ceilings, which meant virtually everything. Predictions were heard that some small consumers might pay as much as $30 a ton for quick shipments in the first flush of the "free market," but big operators were generally looking to Pittsburgh, and especially Big Steel, for their cues. Meanwhile trading was at a standstill and quotations were strictly nominal. A 5000-ton boat load of steel making scrap was scheduled to arrive this week from the upper lakes and possibly one more will be booked before navigation closes.

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CINCINNATI—The trade here is still waiting to see the market trend before giving any definite price quotations. The flow of production scrap showed no improvement last week and while mills were meeting current demand they had no sizable stockpiles against the winter.

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ST. LOUIS—The end of controls found the scrap iron industry here unprepared with new prices. Some steel mills have anticipated the payment of higher prices and will pay them willingly but how much more above the ceilings is not known. Some factors here believe it will be a week before new prices are established, meanwhile there is no buying. Some shipments are being made at open prices and dealers are loading material to be ready to be shipped when prices are established. However, as it stands now there are no quotations for any item. Some railroad lists have been withdrawn as a result of decontrol.

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BIRMINGHAM—Trade sources will not be surprised to see openhearth grades reach $25 per ton delivered now that price controls have been removed but they do not expect a flurry of shipping to develop until sellers can accurately gauge all price angles. With inventories extremely short, consumers certainly will continue to make commitments unless it becomes obvious that the increases are getting out of hand.

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SAN FRANCISCO—The trade expects some advances on No. 1 and the premium grades but the three principal mill buyers here are covered for their November requirements at the old ceilings so no new market determination is seen possible before the end of this week at the earliest.

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TORONTO—Scrap iron and steel receipts failed to show any material improvement during the week and while dealers and other suppliers have been successful in meeting day to day demands of the steel mills, there has been no accumulation of supplies. Iron scrap materials continue in critical short supply and grey iron foundries and other consumers are unable to increase smelting operations. Dealers report only small stocks of steel scrap in their yards and do not believe that there is any upholding for higher prices.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Pending establishment of a market in some districts and in certain grades, the former OPA ceiling price is inserted for reference, followed by an asterisk.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 comp'd bundles	25.00 to 25.50
RR. hvy. melting	25.50 to 26.00
No. 2 hvy. melting	25.00 to 25.50
RR. scrap rails	25.50 to 26.00
Rails 3 ft. and under	28.00 to 28.50
No. 1 comp'd bundles	25.00 to 25.50
Hand bdld. new shts.	25.00 to 25.50
Hvy. axle turn.	24.50 to 25.00
Hvy. steel forge turn.	24.50 to 25.00
Mach. shop turn.	17.50 to 18.00
Short shov. turn.	19.50 to 20.00
Mixed bor. and turn.	17.50 to 18.00
Cast iron borings	18.50 to 19.00
No. 1 cupola cast.	28.00 to 30.00
Heavy breakable cast.	23.00 to 24.00
Malleable	26.00 to 26.50
RR. knuck. and coup.	27.00 to 27.50
RR. coil springs	27.00 to 27.50
Rail leaf springs	27.00 to 27.50
Rolled steel wheels	27.00 to 27.50
Low phos.	25.00 to 25.50

CHICAGO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$23.75 to $24.25
No. 2 hvy. melting	23.75 to 24.25
No. 1 bundles	23.75 to 24.25
No. 2 dealers' bndls.	23.75 to 24.25
Bundled mach. shop turn.	23.75 to 24.25
Galv. bundles	16.75*
Mach. shop turn.	16.25 to 16.75
Short shovels, turn.	18.25 to 18.75
Cast iron borings	16.75 to 17.25
Mix. borings & turn.	16.25 to 16.75
Low phos. hvy. forge	23.75 to 24.25
Low phos. plates	23.75 to 24.25
No. 1 RR. hvy. melt.	24.25 to 24.75
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Malleable	24.00*
No. 1 mach. cast.	28.00 to 30.00
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	20.00*
RR. grate bars	17.75*
Cast iron brake shoes	17.75*
Stove plate	23.00*
Clean auto cast.	27.00*
Cast iron carwheels	22.00*

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	**$19.50***
No. 2 hvy. melting	**19.50***
No. 1 bundles	**19.50***
No. 2 bundles	**19.50***
Mach. shop turn.	**$10.50 to 11.00**
Shoveling turn.	**12.50 to 13.00**
Cast iron borings	**11.50 to 12.00**
Mixed bor. & turn.	**11.50 to 12.00**
Low phos. plate	**22.00***
No. 1 cupola cast.	**25.00***
Hvy. breakable cast.	**20.00***
Stove plate	**23.00***
Scrap rails	**21.00***

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	**$15.05***
No. 2 hvy. melting	**15.05***
Nos. 1 and 2 bundles	**15.05***
Busheling	**15.05***
Turnings, shovelings	**12.05***
Machine shop turn.	**10.05***
Mixed bor. & turn.	**10.05***
Cl'n cast, chem. bor.	**$13.06 to 14.15***
No. 1 machinery cast	**25.00***
No. 2 machinery cast	**21.00***
Breakable cast.	**20.00***
Stove plate	**23.00***

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	**$17.32***
No. 2 hvy. melting	**17.32***
No. 1 bundles	**17.32***
New busheling	**17.32***
Flashings	**17.32***
Mach. shop turn.	**12.32***
Short shov. turn.	14.32*
Cast iron borings	**13.32***
Mixed bor. & turn.	**12.32***
Low phos. plate	**19.82***
No. 1 cupola cast.	**25.00***
Charging box cast.	**21.00***
Hvy. breakable cast.	**20.00***
Stove plate	**23.00***
Automotive cast.	**27.00***

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$23.75 to $24.25
No. 2 hvy. melting	23.75 to 24.25
No. 2 bundles	23.75 to 24.25
Mach. shop turn.	18.25 to 18.75
Shoveling turn.	18.25 to 18.75
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	35.00
Hvy. breakable cast	30.00
Cast. charging box	31.00
Clean auto cast	35.00
Hvy. axle forge turn.	20.75 to 21.25
Low. phos. plate	23.75 to 24.25
Low. phos. punchings	23.75 to 24.25
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. maleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 heavy melting	**$17.50***
Bundled sheets	**17.50***
Mach. shop turn.	**12.50***
Locomotive tires, uncut	**21.00***
Misc. std. sec. rails	**19.00***
Rerolling rails	**21.00***
Steel angle bars	**21.00***
Rails 3 ft and under	**21.50***
RR. springs	**22.00***
Steel car axles	**24.50***
Stove plate	**23.00***
Grate bars	**15.25***
Brake shoes	**17.75***
Malleable	**24.00***
Cast iron carwheels	**22.00***
No. 1 mach'ery cast	**22.00***
Breakable cast.	**20.00***

BIRMINGHAM

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	21.00 to 22.00
Long turnings	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	25.00 to 27.50
Stove plate	**23.00***
Steel axles	**18.50***
Scrap rails	**18.50**
Rerolling rails	**20.50***
Angles & splice bars	21.00*
Rails 3 ft. & under	**21.00***
Cast iron carwheels	**22.00***

YOUNGSTOWN

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$24.50 to $25.00
No. 2 hvy. melting	24.50 to 25.00
Low phos. plate	25.00 to 25.50
No. 1 busheling	23.00 to 23.50
Hydraulic bundles	24.50 to 25.00
Mach. shop turn.	18.00 to 18.50
Short. shovel. turn.	20.00 to 20.50
Cast iron borings	19.00 to 19.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$20.33
No. 2 hvy. melting	20.33
Comp. black bundles	20.33
Comp. galv. bundles	18.33
Mach. shop turn.	15.33
Mixed bor. & turn.	15.33
Shoveling turn.	17.33
No. 1 cupola cast	28.00
Hvy. breakable cast.	**20.00***
Charging box cast.	**21.00***
Stove plate	**23.00***
Clean auto cast.	**27.00***
Unstrip. motor blks.	**20.00***
Cl'n chem. cast bor.	**14.33***

BUFFALO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	**$19.25***
No. 1 bundles	**19.25***
No. 2 bundles	**19.25***
No. 2 hvy. melting	**19.25***
Mach. shop turn.	**14.25***
Shoveling turn.	**16.25***
Cast iron borings	**15.25***
Mixed bor. & turn.	**14.25***
No. 1 cupola cast	**25.00***
Charging box cast	**21.00***
Stove plate	**23.00***
Clean auto cast	**27.00***
Malleable	**24.00***
Low phos. plate	**21.75***
Scrap rails	**20.75***
Rails 3 ft. & under	**22.75***
RR. steel wheels	**23.75***
Cast iron carwheels	**22.00***
RR. coil & leaf spgs.	**23.75***
RR. knuckles & coup.	**23.75***
No. 1 busheling	**19.25***

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.00 to $24.50
No. 2 hvy. melting	24.00 to 24.50
Compressed sheet stl.	24.00 to 24.50
Drop forge flashings	21.50 to 22.00
No. 2 bundles	24.00 to 24.50
Mach. shop turn.	17.50 to 18.00
Short shovel.	19.50 to 20.00
No. 1 busheling	22.50 to 23.00
Steel axle turn.	21.50 to 22.00
Cast iron borings	20.50 to 21.00
Mixed bor. & turn.	19.50 to 20.00
No. 2 busheling	21.50 to 22.00
No. 1 machinery cast	29.50 to 30.00
Malleable	26.00 to 26.50
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	23.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Elec. furnace punch	24.00 to 24.50

SAN FRANCISCO

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	**$17.00***
No. 2 hvy. melting	**17.00***
No. 2 bales	**17.00***
No. 3 bales	**15.00***
Mach. shop turn.	**12.00***
Elec. furn. 1 ft. und.	**19.50***
No. 1 cupola cast	**25.00***
RR. hvy. melting	**18.00***

LOS ANGELES

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	**$17.00**
No. 2 hvy. melting	**17.00**
No. 1 bales	**17.00**
No. 2 bales	**17.00**
No. 3 bales	**15.00**
Mach. shop turn.	**13.00**
No. 1 cupola cast	**25.00**

SEATTLE

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 & No. 2 hvy. melting	**$14.50***
Elec. furn. 1 ft. und.	**17.00**
No. 1 cupola cast	**25.00***
RR. hvy. melting	**14.50***

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	**$17.50***
No. 1 bundles	**17.50***
No. 2 bundles	**17.00***
Mixed steel scrap	**16.50***
Rails, remelting	**18.50***
Rails, rerolling	**21.50***
Bushelings	**13.00***
Mixed borings & turnings	**12.50***
Electric furnace bundles	**20.50***
Manganese steel scrap	**20.00***
No. 1 cast	**19.00***
Stove plate	**17.50***
Car wheels, cast	**19.50***
Malleable iron	**16.00***

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

(cents per pound)	Nov. 12, 1946	Nov. 5, 1946	Oct. 8, 1946	Nov. 13, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Ternplate:				
(dollars per base box)				
Tinplate, standard cokes..	$5.00	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302).	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products:				
(cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails:				
(dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				
Semifinished Steel:				
(dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp:				
(cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

(per gross ton)	Nov. 12, 1946	Nov. 5, 1946	Oct. 8, 1946	Nov. 13, 1945
No. 2 foundry, Phila.	$30.43	$30.43	$30.43	$27.59
No. 2, Valley furnace	28.50	28.50	28.50	25.75
No. 2, Southern, Cin'ti	27.80	27.80	27.80	26.19
No. 2, Birmingham	24.88	24.88	24.88	22.13
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.75
Basic, del'd eastern Pa.	29.93	29.93	29.93	27.09
Basic, Valley furnace	28.00	28.00	28.00	25.25
Malleable, Chicago†	28.50	28.50	28.50	25.75
Malleable Valley	28.50	28.50	28.50	25.75
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.
* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$25.25	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	24.00	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	24.00	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	29.00	25.00	25.00	20.00
No. 1 cast, Philadelphia	35.00	25.00	25.00	20.00
No. 1 cast, Chicago	29.00	25.00	25.00	20.00

* Nominal

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	17.50	14.375	14.375	12.00
Copper, Lake, Conn.	17.50	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	10.50	9.25	8.25	8.25
Lead, St. Louis	10.35	8.10	8.10	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	23.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Nov. 12, 1946	2.70711¢ per lb.	$28.13 per gross ton	$24.42 per gross ton
One week ago	2.70711¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One month ago	2.70711¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One year ago	2.44104¢ per lb.	$25.37 per gross ton	$19.17 per gross ton

	HIGH		LOW		HIGH	LOW	HIGH	LOW
1946	2.73011¢	July 4	2.54490¢	Jan. 1	$28.13 May 29	$25.37 Jan. 1	$24.42 Nov. 12	$19.17
1945	2.44104¢	Oct. 2	2.38444¢	Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢	Sept. 5	2.21189¢	Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢		2.29176¢		23.61	23.61	$19.17	$19.17
1942	2.28249¢		2.28249¢		23.61	23.61	19.17	19.17
1941	2.43078¢		2.43078¢		$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2,32263¢	Dec. 28	2.05200¢	Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢	Jan. 7	1.97319¢	Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.

Especially **when producing parts in large quantities**

• Jessop's "Malta" carbide is one of the most versatile of tool and die materials . . . increasing production in hundreds of cutting, drawing, stamping, and other metal working applications. Where wear is a problem, "Malta" carbides will drastically cut production costs in the majority of applications.

It is in the production of small parts in large quantities that the cost-saving features of "Malta" carbides are most quickly realized. For example, the carbide inserted cold header dies shown in the illustration are capable of cold heading thousands of rivets before regrinding is necessary. The longer the production run the more savings multiply.

Our modern production facilities permit us to render prompt service on all carbide applications . . . whether tools, dies, or wear resisting parts. Write on your company letterhead for new 24-page catalogue describing JESSOP'S "Malta" carbide and "T & V" cast alloy.

JESSOP STEEL CO.
WASHINGTON, PA.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$48.69	$48.69				$48.69	(Bethlehem, Massillon, Canton, Coatesville=$48.69)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$39	$39	$39	$39	$39	$39	(Provo=$50.20, Duluth=$41[14]) $39	$39				$51.50[14]	$41.50		
Carbon, forging billets	$47	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14]) $47					$59.50[14]	$49.50		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$60.93		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢		(Worcester=2.40¢)				2.585¢	2.835¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.875¢	2.425¢		3.01¢	2.58¢	2.685¢	2.615¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.98¢	3.41¢	3.635¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.50¢	4.05¢		4.635¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.485¢	3.935¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.885¢	3.335¢	3.60¢	3.56¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.835¢		4.45¢	4.41¢
STRIP															
Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.135¢	2.585¢	2.85¢	2.81¢
Hot-rolled [3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.035¢	2.485¢	2.75¢	2.71¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.185¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.375	$5.301
Electro, box 0.25 lb	$4.35	$4.35	$4.35					$4.35							
Electro, box 0.50 lb	$4.50	$4.50	$4.50					$4.60	$4.60						
Electro, box 0.75 lb	$4.65		$4.65					$4.75	$4.75						
BLACKPLATE															
29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.56¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30					$4.40	$4.40						
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Duluth=2.60¢) (Provo, Utah=3.20¢)			2.885¢	3.185¢	2.635¢	2.84¢	2.86¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.885¢	3.185¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.735¢	2.785¢	2.485¢	2.61¢	2.69¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.735¢	2.785¢	2.485¢		
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem, Massillon, Canton=2.92¢)					3.065¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.765¢		
PLATE								(Coatesville, Claymont=2.50¢ Geneva Utah=2.65¢)							
Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.885¢	3.085¢	2.755¢	2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.135¢	4.435¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.305¢	4.525¢		4.01¢	3.895¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Geneva, Utal=2.50¢) (Bethlehem=2.35¢)				2.735¢	3.035¢		2.54¢	2.48¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢			(Worcester=3.25¢)								
0.51 to 0.75 carbon	4.65¢			4.65¢			(Worcester=4.85¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	9.03¢			9.03¢			(Worcester=9.23¢)								
WIRE [9]															
Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)					3.585¢		3.44¢	3.41¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢) (Trenton=4.25¢)					4.535¢		4.39¢	4.339¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.235¢		2.99¢	3.01¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	38.79	28.87	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	*5.15¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

*Plus 12 pct.

Basing points, light rails, Pittsburgh, Chicago, Birmingham: cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.75	$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50c a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70	3.70	3.732†‡	.....
Cold rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.65†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging or heat treating grade.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
⅛-in.	60½	48
¼-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

⅛-in.	17⅞	+4⅝
¼-in.	24¼	2⅝
1-in. and 1¼-in.	28⅝	9½
1½-in.	33	11⅞
2-in.	32⅜	11⅜

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅜
4½-in. to 8-in.	27	10¼

Steel (butt, extra strong, plain ends)

⅛-in.	58½	47½
¼-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

⅛-in.	18⅞	+1⅝
¼-in.	25⅝	4¾
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28⅛	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅜	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lap-weld, Hot-Rolled
2 in. O.D.	13 B.W.G. 16.52	13.90	13.20
2½ in. O.D.	12 B.W.G. 22.21	18.70	17.67
3 in. O.D.	12 B.W.G. 24.71	20.79	19.56
3½ in. O.D.	11 B.W.G. 31.18	26.25	24.68
4 in. O.D.	10 B.W.G. 38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft to 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in., del'd Chicago.....$70.33
6-in. to 24-in., del'd New York.... 69.60
6-in. to 24-in., Birmingham..... 61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less 34.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter...65½
9/16 & ⅝ in. x 6 in. & shorter.....63½
¾ to 1 in. x 6 in. & shorter.....61
1⅛ in. and larger, all lengths.....59
All diameters over 6 in. long.....59
Lag, all sizes 62
Plow bolts 65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger 56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller.....	62	..
½ in. through 1 in.....	..	60
9/16 in. through 1 in.....	59	..
1⅛ in. through 1½ in....	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Consumer

Packages, nuts loose .....71 and 10
In packages 71
In bulk 80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $4.75
F.o.b. Lebanon, Pa. 4.90

Small Rivets
(7/16 *in. and smaller*)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws *Percent Off List*
(In packages) *Consumer*

Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in..... 64
Upset set screws, cup and oval points 71
Milled studs 46
Flat head cap screws, listed sizes..... 36
Fillister head cap, listed sizes..... 51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%.....	32.00
60% but less than 65%.....	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer $5.45
Old range, non-bessemer 5.30
Mesaba, bessemer 5.20
Mesaba, non-bessemer 5.05
High phosphorus 5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh..19¼¢ to 21½¢
Copper, electrolytic, 100 and 375 mesh .....23½¢ to 27½¢
Copper, reduced, 150 and 200 mesh ..... 23¾¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.....11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags....7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots ..... 63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe ..... 17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe .....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots 25¢
Antimony, 100 mesh ..... 30¢
Cadmium, 100 mesh $1.75
Chromium, 100 mesh and finer..... $1.25
Lead, 100, 200 & 300 mesh.13¼¢ to 16¾¢
Manganese, minus 325 mesh and coarser .....44¢ to 61¢
Nickel, 150 mesh ..... 51½¢
Silicon, minus 325 mesh and coarser .....26¢ to 55¢
Solder powder, 100 mesh..8½¢ plus metal
Tin, 100 mesh ..... 58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.. $2.65
Under 100 lb..... $2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn.	9.35
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads Per 1000

Super-duty brick, St. Louis.....$81.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio 65.00
First quality, New Jersey 70.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 59.00
Sec. quality, New Jesey 62.00
Sec. quality, Ohio 57.00
Ground fire clay, net ton, bulk..... 9.50

Silica Brick

Pennsylvania and Birmingham ...$65.00
Chicago District 74.00
Silica cement, net ton (Eastern)... 11.50
Chicago 12.50

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Plymouth Meeting, Chester $54.00

Magnesite Brick

Standard, Balt. and Chester $76.00
Chemically bonded, Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks $44.50
Domestic, f.o.b. Chewelah, Wash., in bulk 22.00
in sacks 26.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa. 10.05
Midwest, add 10¢; Mo. Valley, add 20¢

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.774	$5.139	$5.249[a]	$4.314	$4.214	$5.064	$3.875	$3.937	$4.114	$4.564	$6.287	$7.387	$7.664	$8.764
New York	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.684	8.784
Boston	4.05	5.031	5.725	4.518	4.418	4.985	4.203	4.023	4.356	4.656	6.503	7.603	7.756	8.856
Baltimore	3.64	5.118	5.365	4.293	4.193	....	3.865	4.05	4.093	4.543	....	....	....	....
Norfolk	4.037	....	5.862	4.577	4.477	....	4.262	4.303	4.377	4.677	....	....	....	....
Chicago	3.475	4.425	5.40	3.95	3.85	4.90[6]	3.80	....	3.75	4.20	6.05	7.15	7.20	8.30
Milwaukee	3.633	4.583	5.558	4.108	4.008	5.058[6]	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Cleveland	3.575	....	5.347	3.95	3.85	....	3.65	3.88	3.60	4.20	6.277	7.377	7.20	8.30
Buffalo	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.85	3.60	4.20	6.05	7.15	7.20	8.30
Detroit	3.71	4.76	5.528	4.085	3.985	4.95	3.935	3.987	3.735	4.285	6.456	7.556	7.585	8.685
Cincinnati	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
St. Louis	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.968	3.918	4.522	6.472	7.572	7.622	8.722
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	6.05	7.15	7.20	8.30
St. Paul	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	....	8.322	7.952	8.052
Duluth	3.817	4.767	5.666	4.292	4.192	....	4.142	4.142	4.092	....	6.472	6.572	....	....
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.775	4.825	5.40	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	....	7.32	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.954	6.414	7.514	7.564	8.614
Memphis	4.221	....	5.746	4.596	4.496	....	4.346	4.346	4.296	4.821	....	....	....	....
New Orleans	4.359*	5.40[1]	5.884	4.734	4.634	....	4.484	4.484*	4.434*	5.175	....	....	....	....
Los Angeles	4.885	6.635[1]	6.585	5.335	5.235	....	4.835	4.735	4.685	6.065	....	....	....	....
San Francisco	4.435	6.035	6.585	4.885	4.785	....	4.535	4.385	4.435	5.815	....	....	....	....
Seattle	4.905[5]	7.305[2]	6.435	4.635	4.535	....	5.035[5]	4.735[5]	4.635[5]	6.265	7.735[8]	8.735[8]	....	9.585[8]
Portland	4.905[4]	....	6.235	5.135	....	....	5.035[4]	4.735[4]	4.735[4]	6.015	7.735	8.885	....	....
Salt Lake City	4.81	....	6.70	5.94	5.84	....	5.29	5.29	5.19	6.48	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over; (8) 1000 lb and over.

([a]) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES					
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	29.00	29.50	30.00	30.50	.....
Birdsboro	29.00	29.50	30.00	30.50	34.00
Birmingham	23.50*	24.88*	.....	29.50	.....
Buffalo	27.50	28.50	29.00	29.50	34.00
Chicago	28.00	28.50	28.50	29.00	.....
Cleveland	28.00	28.50	28.50	29.00	.....
Detroit	28.00	28.50	28.50	29.00	.....
Duluth	28.50	29.00	29.00	29.50	.....
Erie	28.00	28.50	29.00	29.50	.....
Everett	29.00	29.50	30.00	30.50	.....
Granite City	28.00	28.50	28.50	29.00	.....
Hamilton	28.00	28.50	28.50	.....	.....
Neville Island	28.00	28.50	28.50	29.00	.....
Provo	26.00	26.50	.....	.....	.....
Sharpsville	28.00	28.50	28.50	29.00	.....
Sparrows Point	29.00	29.50	.....	.....	.....
Steelton	29.00	.....	.....	.....	34.00
Swedeland	29.00	29.50	30.00	30.50	.....
Toledo	28.00	28.50	28.50	29.00	.....
Youngstown[1]	28.00	28.50	28.50	29.00	.....

DELIVERED PRICES (BASE GRADES)						
Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Boston	Birdsboro-Steelton	4.47	.....	.....	.....	.....	38.47
Brooklyn	Bethlehem	2.78	31.78	32.28	32.78	33.28	.....
Brooklyn	Birdsboro	3.26	.....	.....	.....	.....	37.28
Canton	Clev. Ygstn, Sharpsvll.	1.54	29.54	30.04	30.04	30.54	.....
Canton	Buffalo	3.55	.....	.....	.....	.....	37.58
Cincinnati	Birmingham	4.30	27.80*	29.18*	.....	.....	.....
Cincinnati	Hamilton	1.24	.....	.....	29.74	.....	.....
Cincinnati	Buffalo	4.89	.....	.....	.....	.....	38.89
Jersey City	Bethlehem	1.70	30.70	31.20	31.70	32.20	.....
Jersey City	Birdsboro	2.16	.....	.....	.....	.....	36.16
Los Angeles	Provo	5.25	31.25	31.75	.....	.....	.....
Los Angeles	Buffalo	16.33	.....	.....	.....	.....	50.33
Mansfield	Cleveland-Toledo	2.16	30.16	30.66	30.66	31.16	.....
Mansfield	Buffalo	3.74	.....	.....	.....	.....	37.74
Philadelphia	Swedeland	0.93	29.93	30.43	30.93	31.43	.....
Philadelphia	Birdsboro	1.38	.....	.....	.....	.....	35.38
San Francisco	Provo	5.25	31.25	31.75	.....	.....	.....
San Francisco	Buffalo	16.33	.....	.....	.....	.....	50.33
Seattle	Provo	5.25	31.25	31.75	.....	.....	.....
Seattle	Buffalo	16.33	.....	.....	.....	.....	50.33
St. Louis	Granite City	0.50 Arb.	28.50	29.00	29.00	29.50	.....
St. Louis	Buffalo	7.86	.....	.....	.....	.....	41.86

* Republic Steel Corp. charges $2 more on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace. Delivered to Chicago, $42.34.

High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$34.00; f.o.b. Buffalo—$35.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05	6.30	6.60
Ton lots	6.65	7.55	8.55
Less ton lots	6.80	7.80	8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $51.25 f.o.b. Keokuk, Iowa; $48.00 f.o.b. Jackson, Ohio; $49.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10	13.55	16.50
97% Si, 1% Fe	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.15	4.55	4.60
Less ton lots	4.40	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
85-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.85
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.35
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

carload lots	25¢
Ton lots	26¢

Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots	58¢
Ton lots	59¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Czech Iron and Steel Industry Faces Huge Task Under New 2-Yr Plan

Prague

• • • **President Benes** has announced the signing of a 2-yr plan for the industrial recovery of Czechoslovakia. Full particulars of this reconstruction plan are not yet available, but it is understood that they will include the compelling of certain age groups of women to enter industry and land work, youth mobilization, and the further dismissal of 100,000 public servants for transfer to industry.

The Czechoslovak iron and steel industry is reported to have already done all it can to insure the completion of the various tasks falling to it under the government's plan, and together with the mining industry it was the first to have the formation of its various national enterprises announced by the Czechoslovak Ministry of Industry. It was first necessary to investigate the affairs in detail of some dozens of factories and works either nationalized or confiscated in order to combine them into six large national enterprises, three of which — the Vitkovice Ironworks, the United Steelworks, and the Mining & Foundry Co.—are concerns of enormous size. For example, the United Steelworks alone, formed by the combination of the Prague Ironworks and Poldi Foundries, controls more than 30 factories. The three smaller enterprises—"Kovohute," the Bohemian Rolling Mills, and the Moravian Rolling Mills—are themselves organizations of considerable size. The work of the directors of the various organizations and their deputies has for the past 6 months been concentrated upon production programs, questions of social policy and personnel, and economic, financial, price and organizational matters, so that today the iron and steel industry has a strong and unified organization.

For additional information on Czechoslovakia's 2-yr plan see THE IRON AGE, *Nov. 7, p. 129.*

The sale of iron and steel products has been centralized by the general directorate of the industry into the hands of the following six sales organizations:

Sdruzel—dealing in raw iron, rolled steel, tubes and tube products

Helika—dealing in wire nails, woven wire goods, bright steel and commercial cast iron

Runa—the domestic sales and export of semifinished goods of nonferrous and light metals

Ferra — raw metals, foundry requisites, semifinished electrotechnical products

Ferropol — wire goods, tools, chains

Ferromet — export of rolled goods, tubes, woven wire goods and rails

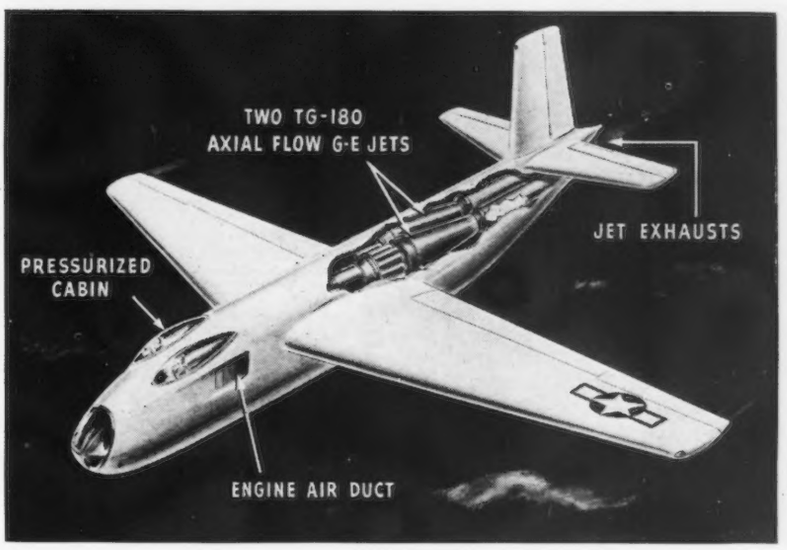
The distribution network also utilizes various nationalized and confiscated firms, and the purchase of raw materials and collection of scrap or waste material is centralized under the directorate. As the industry manufactures no great variety of goods, but produces them in large numbers, the centralization of purchase and sales activities adequately meets the requirements and conditions of the industry.

Ever since nationalization was first announced there have been difficulties regarding raw materials, especially coal and ore, labor supplies, and finance and prices. Evidence of the gradual improvement in the supply of raw materials is apparent in comparing the August 1946 iron ore import figure of 208,027 net tons with those for January and July of this year which were 76,902 tons and 165,016 respectively. Czechoslovakia's ore imports came mainly from the Soviet Union, but recently good quality ore has been imported from Sweden by way of Gdynia and the Polish railways.

Heavy industry delivers basic products at prices far below the present day level of increased prices, which fact is at the root of the price problem and the question of the solvency of the iron and steel industry. The financial troubles arose from the fact that the various national organizations took over the property of concerns which were all heavily and some even hopelessly in debt, but steps have been taken which it is hoped will surmount this difficulty without aid from the state finances.

Working morale in the industry is good, and as compared with production at the time of nationalization, the output of raw iron has risen by 89 pct, raw steel by 78 pct and rolled products by 62 pct. In August last the production of raw iron amounted to 90,718 tons and raw steel 146,413 tons, and the industry will have considerable headway to make in order to carry out the 2-yr plan which requires an average monthly output in 1948 of 128,260 tons of raw iron and 201,300 tons of raw steel.

FIRST JET BOMBER: *The world's first jet bomber, the Army Air Forces' XB-43, which was recently revealed to have made its first test flight last May at Muroc Field, Calif. Built by Douglas, it is powered by two General Electric TG-180 jet engines which are expected to drive it at more than 500 mph. Both GE and Allison Div. of General Motors are now manufacturing the engines.*



THERMOIL-GRANODINE

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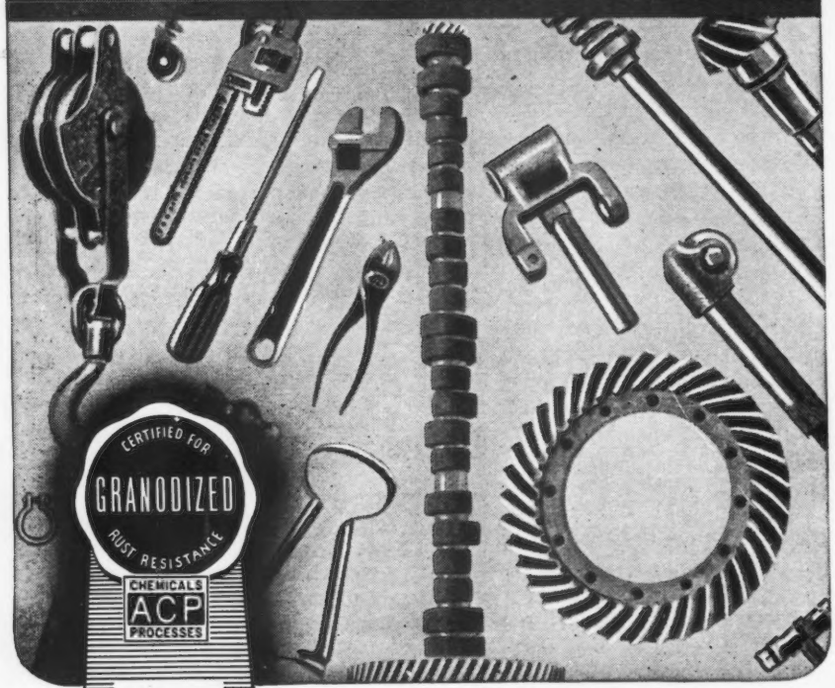

THERMOIL-GRANODINE creates on steel an oil-absorbing, paint bonding, crystalline coating of iron and manganese phosphate, integrated with the base metal.

CORROSION RESISTANT

—THERMOIL-GRANODINE treated surfaces, when oiled, prevent rust and corrosion and provide a durable foundation that tenaciously holds organic finishes. Thermoil-Granodine is also excellent rust protection for tools, nuts, bolts and unpainted replacement machine parts.

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—THERMOIL-GRANODINE coatings, when oiled, maintain lubrication and prevent excessive wear on friction parts—eliminate break in troubles when new friction parts are run at high speed or under heavy pressure. Thermoil-Granodine provides an ideal coating on piston rings, gears, tappets, valves, camshafts, spiders, etc.

Cold SPRAY-GRANODINE

Cold SPRAY-GRANODINE may be *applied at room temperature* and provides a uniform, smooth zinc phosphate coating—a superior base for lustrous, enduring paint finish. Cold SPRAY-GRANODINE is of special interest to fabricators of automobile bodies, fenders, refrigerators, cabinets and in general for the proper preparation of sheet steel products for durable and lustrous finishes.

* Trade Mark
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Names 11 to Serve On General Committee Of Western Metal Show

Cleveland

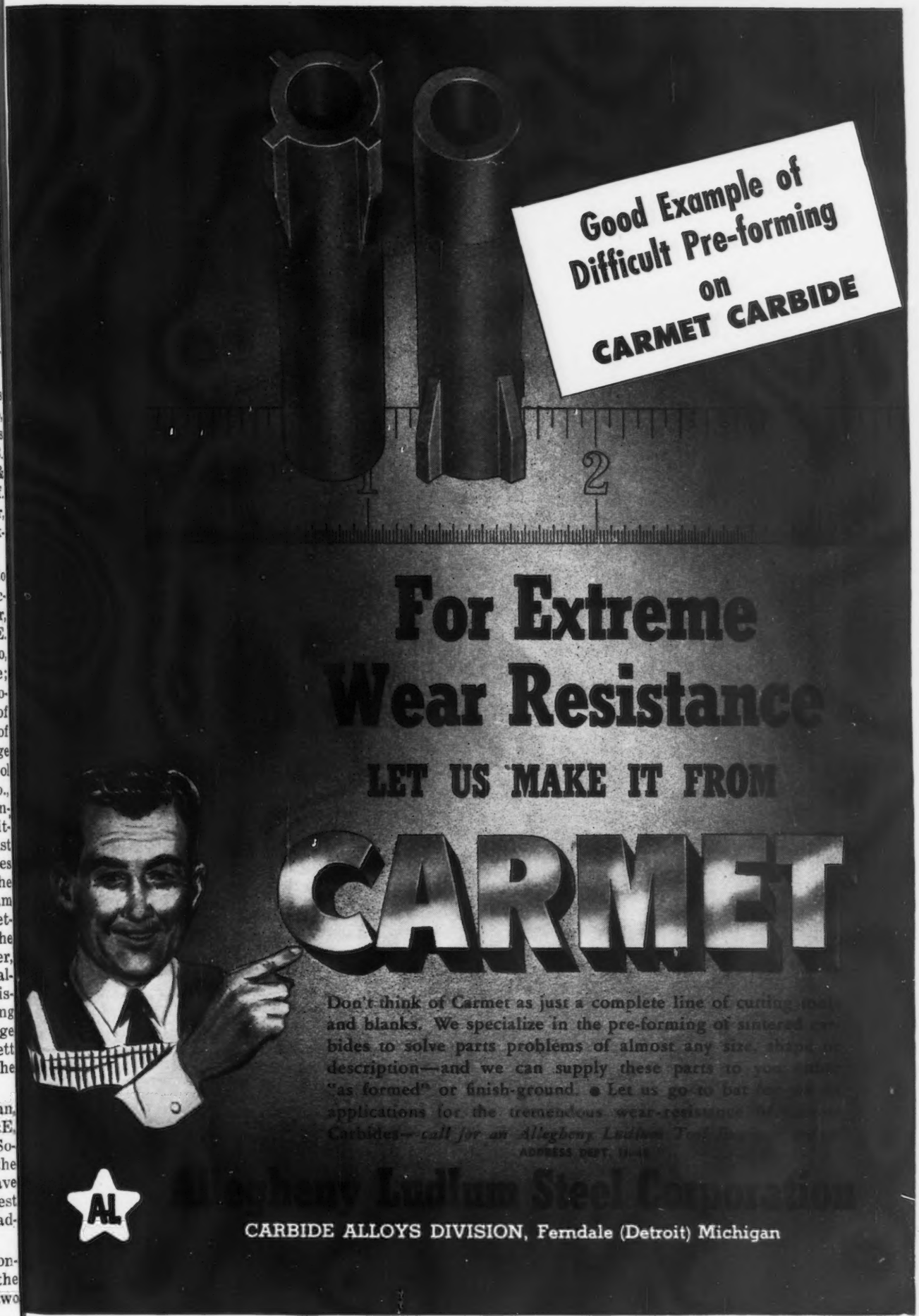
• • • **Eleven prominent** manufacturers and engineers from the Pacific Coast, headed by E. S. Hudson, manager of the Western Forge & Tool Works, Oakland, have been named to the general committee of the fifth Western Metal Congress and Exposition, which will be held in the San Francisco - Oakland Golden Gate area for 6 days beginning Mar. 22, 1947.

Associated with Mr. Hudson as vice-chairmen are C. D. Amico, steel specialist, Joseph T. Ryerson's Sons Co., Los Angeles, and F. B. Drake, president, Johnson Gear & Mfg. Co., Ltd., Berkeley, Calif. Harold E. Krayenbuhl, engineer, Oliver United Filters, Inc., Oakland, is secretary.

Other committee members also acting as chairmen of their respective committees are W. A. Fletcher, western division sales manager, E. F. Houghton Co., San Francisco, chairman of the exhibit committee; Dr. John E. Dorn, associate professor of metallurgy, University of California, Berkeley, chairman of the program committee; George Huck, manager of alloy and tool steel sales, Bethlehem Steel Co., San Francisco, chairman of the information and registration committee; H. P. Etter, Pacific Coast sales manager, Air Reduction Sales Co., San Francisco, chairman of the entertainment committee; William Butts, vice-president, General Metals Corp., Oakland, chairman of the publicity committee; David Reeder, division manager, Electro Metallurgical Sales Corp., San Francisco, chairman of the cooperating societies committee; and George Burnside, partner, Coulter-Sibbett Steel Co., Oakland, chairman of the attendance committee.

According to W. H. Eisenman, managing director of the WMC&E, and secretary of the American Society for Metals, sponsors of the joint meetings, the event will have the active cooperation of West Coast chapters of the nation's leading technical societies.

Technical meetings of the congress and industrial exhibits of the Exposition, will be held in the two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adjoining Oakland Civic Auditoriums.

Plans are under way for lecture courses, technical papers and round table conferences of interest to the metals, aircraft, chemical, petroleum, mining and general manufacturing industries.

World Electrochemists Discuss Achievements Made During Wartime

Toronto

• • • **Electrochemists** from all parts of the world met in Toronto Oct. 16 to 19. The general theme of the congress was "Electrochemistry's Contributions to the Winning of the War."

There were sessions on: Advance in electrodeposition, rectifiers and power supply, new plastic insulators, theoretical electrochemistry, the new batteries, and problems in magnesium production.

A total of 40 scientific and technical reports were presented. The gala event of the congress was the presentation of the Edward Goodrich Acheson gold medal and thousand dollar prize to Professor H. Jermain Creighton of Swarthmore College, Pennsylvania, in recognition of his outstanding accomplishments and fundamental researches in electrochemistry. Dr. Creighton, in his speech of acceptance, is expected to reveal a number of far-reaching inventions and discoveries in electrochemistry made during World War II.

Of very special interest were the dozen or more new plastics including silicones, vinyl polymers, polyethylenes, styrene and copolymers.

During the war the familiar flashlight battery, a most conservative product for many years, was forced to do unheard of stunts. The fundamental components of the battery were radically changed. The performance of the new batteries ranges between very wide limits: Batteries for 1000 v and a minimum of current or batteries furnishing 1000 amp at a mere fraction of a volt to meet the urgent and persistent demands of our Army and Navy engineers.

The headquarters of the Electrochemical Society are in New York, Colin G. Fink, secretary.

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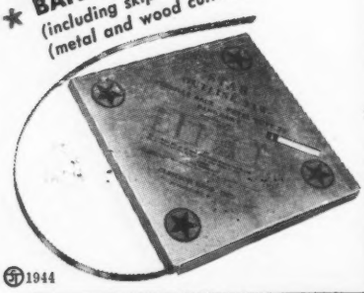
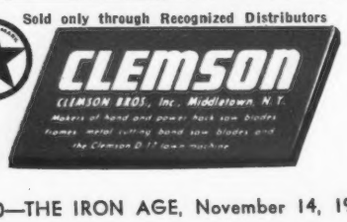


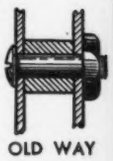
1944

Sold only through Recognized Distributors



FASTENING PROBLEM:

Simplify fastening of double back wall sections of gas stove. Old way is awkward. (Air must circulate freely around chimney to reduce fire hazards.)



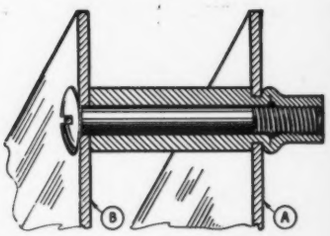
OLD WAY

★ ★ ★

SOLUTION:

This **RIVNUT**

used like this...



10-24 thread aluminum Rivnuts wit ½" spacer heads were inserted i sheet "A" and upset. Outer wall "B was placed with holes matchin hollow threaded shank of Rivnut Screw attachments were entered i holes and tightened. Air circulate freely, fire hazards were reduced Underwriters' regulations satisfie There were no awkward reaches wit hard-to-handle tools. Rivnuts adap ability easily answered this proble Perhaps it could solve yours?

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- *IN COMMERCIAL LENGTH*
- *CUT TO SPECIAL LENGTHS*

SQUARE	ROUND	RECTANGULAR
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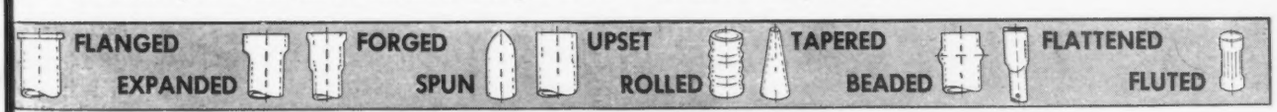
Whether you form and machine the parts in your plant or order them prefabricated by Michigan, you will find this tubing exceptionally uniform in structure and adapted to reworking by any production process. Michigan welded tubing can be:



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Prices on CLARK *products will not be advanced in excess of increased costs.*

Metalworking Firms In Ohio Planning New Plants and Additions

Cleveland

• • • **Despite shortages** of materials, particularly steel and pig iron, the large number of metalworking companies incorporated in Ohio within the last 30 days lends additional support to the optimistic industrial outlook. New plants and additions to present manufacturing facilities round out the promise of unprecedented peacetime production when basic materials are again in long supply.

The following list of companies, which includes fabricators, foundries and tool and die shops, is a fairly representative cross-section of new small business activity in the metalworking field in Ohio.

Dayton—Partners Tool & Die Co., a recently formed corporation, has leased a plant for the manufacture of tools, dies, fixtures, gages and molds. They are now installing new equipment and machinery and expect to start operations soon with from 10 to 20 employees. Officers of the firm are: Ray Dressman, president; Robert C. Helmer, vice-president; R. E. Showalter, secretary, and L. C. Showalter, treasurer.

Conneaut, Ohio — Conneaut Foundry & Machine Co., which was incorporated by Catherine C., Mildred M., and Claude A. Schmidle of Cleveland, will locate a plant here to employ about 50 workers. Production is expected to start early in 1947.

Cincinnati—Hollaender Mfg. Co. will enter the plumbing supplies field, according to P. R. Hollaender, head of the firm. Mr. Hollaender has acquired a two-story building which will house the new company as well as his own plumbing business. The new firm will manufacture plumbing specialty devices which Mr. Hollaender has invented. Some of the products already have national distribution. The new organization will replace the Hollaender Hanger Co.

Cleveland—The Schmeller Aluminum & Foundry Co. has been incorporated to succeed the EFH Aluminum Foundry & Smelting Co., formerly operated as a partnership, according to an an-

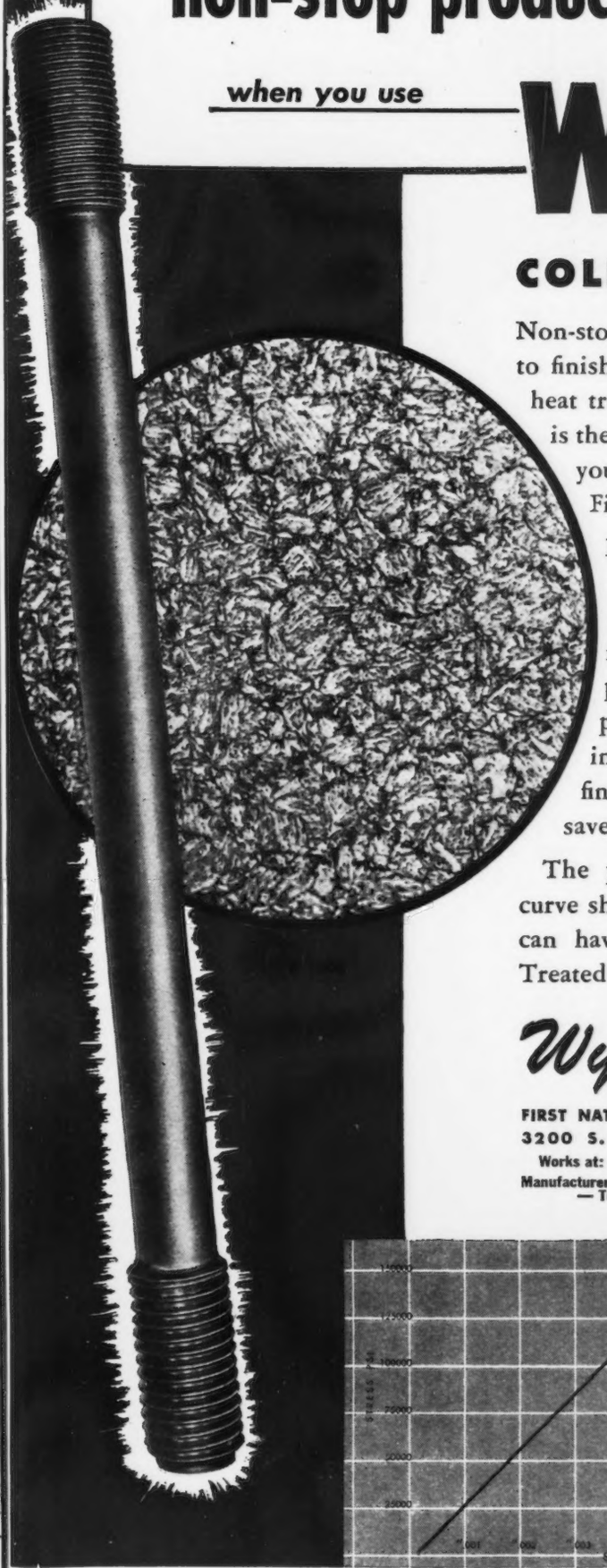
non-stop production cuts costs...

when you use

Wyckoff

HEAT TREATED

COLD FINISHED STEEL



Non-stop production . . . from bar stock direct to finished product without interruption for heat treating, cleaning or straightening . . . is the cost-cutting method you follow when you use Wyckoff Heat Treated Cold Finished Steel.

Heat Treated at the mill to your individual requirements, Wyckoff Steel provides you with *controlled* uniformity of physical properties in *your* production bar stock. Your parts production becomes a direct machining operation . . . individual testing of finished parts is eliminated . . . and you save several operations in the processing.

The photomicrograph and stress-strain curve shown are typical of the "picture" you can have *in advance* of the Wyckoff Heat Treated Cold Finished Steel you use.

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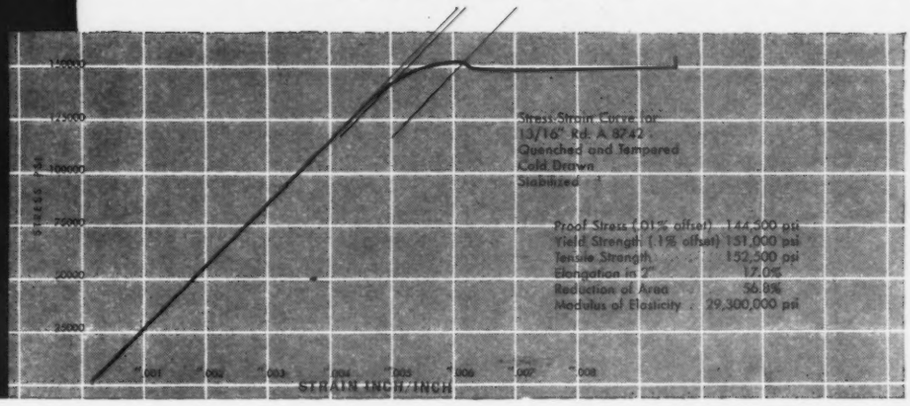
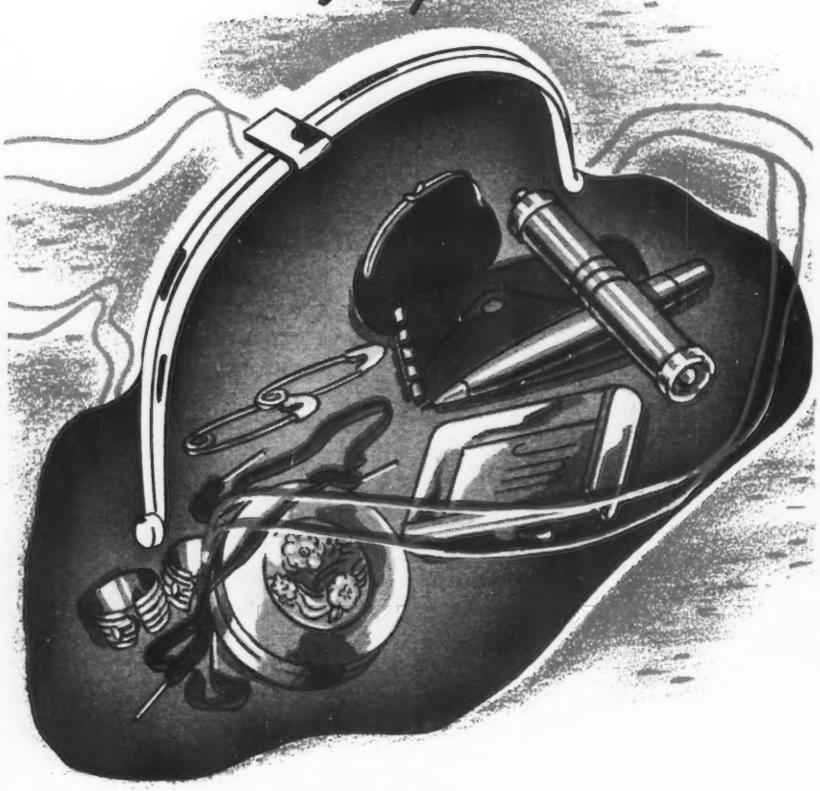


THOMASTRIP *even in your wife's pocketbook*



Look at the thousand and one articles in your wife's pocketbook — compact, cigarette case, lighter, lipstick container, nail file, costume jewelry, pencil, and change purse. Many of these, and even the frame of the purse itself, may be made of ThomaStrip. The wide range of properties and finishes of ThomaStrip has placed this specialty steel in universal use for decorative or functional purposes. Better investigate its versatility, cost-reducing possibilities, and adaptability to your product.

Why? . . . because ThomaStrip extends the benefits of steel beyond the usual scope of use. It is available in a wide range of finishes, coatings, special tempers, and analyses . . . in electro-coated zinc, copper, nickel, and brass . . . hot dipped tin and solder . . . lacquer coated in colors . . . uncoated precision strip . . . carbon and alloy specialties.

THE THOMAS STEEL CO. • WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS

Thomas Strip
COLD ROLLED STRIP STEEL

nouncement by Frank, Edward and Herbert Schmeller.

Hudson, Ohio—Hudson Sheet Metal Co. has been formed here by Frank McDonald. Incorporators were Frank and Helen E. McDonald and J. R. MacGregor. According to the charter, the company will manufacture sheet metal products.

Toledo—L. & J. Forging & Die Methods, Inc., has been formed here to manufacture and sell metal dies. Incorporators are Gerald R. Riley, C. Victor Beck, Jr., and Frank A. Harrington, who chartered the firm with 250 shares of no par value.

Dayton—Dayton Axle Co. has been organized to engage in the manufacture of trailer axles. Incorporators of the company are William A. Rogers, Sherley M. Wilson and Harry P. Jeffery.

Youngstown—Harris Fabricating Co., a new corporation, will engage in the manufacture and fabrication of steel, water and fuel tanks and lawn rollers. The company was capitalized at $10,000 by Frank Harris. Other incorporators are Joseph Wilkoff and Kenneth Harris.

Lodi, Ohio—Lodi Foundry Co. will make aluminum castings in a building now under construction. The building, a 40 x 120 ft structure, is being leased by the company and will be ready for occupancy within a few weeks. Carlton Brewster and Earl Martinson of Orrville, Ohio, incorporated the company, which is now purchasing new equipment and machinery.

Columbus — Buckeye Truck Body Builders, Inc., a new corporation formed by Edgar F. Welch and A. C. Hoffman will manufacture truck bodies from magnesium. The new corporation represents an expansion of the business they have been operating as a partnership under the name of Buckeye Body Builders. A franchise has been granted to the corporation by Revere Copper & Brass Co. to manufacture magnesium bodies out of material fabricated for that purpose at Revere's works in Baltimore. The firm plans to construct a new plant as soon as practicable.

Wickliffe, Ohio—Hendershot & Smith, a new heat-treating plant, is ready to start operations and will specialize in the heat treatment of small high speed steel

ARCOS CORPORATION

invites you
to a demonstration
of its astounding

Oxyarc Process

for

Cutting Stainless and Alloy Steels
and Non-Ferrous Metals

at the

National Metal Congress and Exposition
Atlantic City Municipal Auditorium
November 18-22, 1946

Arcos Exhibit
Main Floor-A 45

You are also invited
to discuss your stainless
and alloy welding problems

SPEED UP CLEANING TIME

TO MEET PRODUCTION REQUIREMENTS

The development of Detrex washers, like all industrial equipment, requires specialized engineering. They are designed to do a faster and more thorough job of cleaning—a factor that saves money in ANY production set-up. Plain talk? Yes, but it's the basis on which successful manufacturers compute their profits!

Included in the refinements recently developed are all-welded header lines insuring improved pump performance, quick-opening access and cleanout doors, chip baskets and screens to cut maintenance time, controlled flexible spray patterns that assure complete coverage. These, and many more features combine with DETREX SERVICE—requisites of SUPERIOR metal cleaning.

This new line of washers is available in many standard sizes to fit many special requirements. Call a Detrex representative today or write to the address below.

DETREX Corporation
DETROIT 32, MICHIGAN
E-145

and alloy parts, dies and tools for various local manufacturing firms. The three members of the firm, Carl Smith and Robert and Harold Hendershot, will operate the plant on a 24-hr basis once the needed chemical salts arrive. They will extend the plant later on the present site as business increases and building materials are more readily available.

Toledo—Unitcast Corp. has leased the steel castings plant which it operated here during the war. The property, on a 25-acre land site, consists of buildings, machinery and equipment including three electric steel furnaces each with a 3-ton per hr capacity. According to company officials, the firm plans to spend about $1,000,000 to improve the installation and expects to employ 600 persons.

Columbus—Columbus Porcelain Metals Corp. has started production in a new 1-story factory building. The company will apply porcelain enamel to prefabricated parts for stoves, refrigerators, metal signs and similar products. The oven installed will turn out 1600 to 1800 sq ft of enamel per hr but because of the business in sight, the company is planning to order a new furnace with five times this capacity.

Cleveland—The Willoughby Machine & Tool Co. has received CPA approval for a new plant. A. H. Rogant and T. Coyne head the company which manufactures thermomatic heating units.

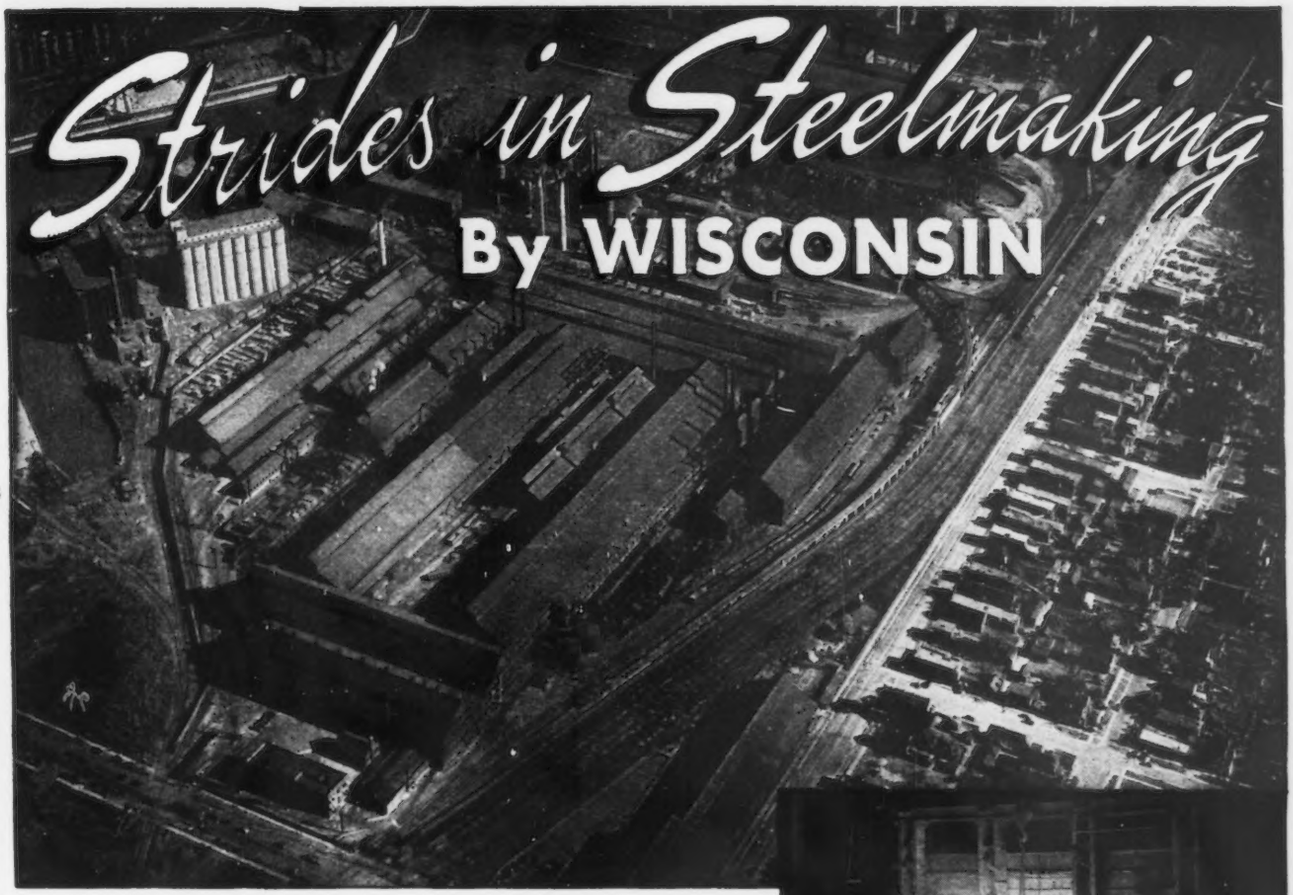
Conneaut, Ohio—The new plant of Perma-Brite Stainless Aluminum Co. is nearing completion and production may start early in November. The plant, which is moving here from Chicago, will process raw aluminum ingots into the finished product, which in turn is made into the various items of kitchenware sold by the company. Machinery is ready to be installed in the plant.

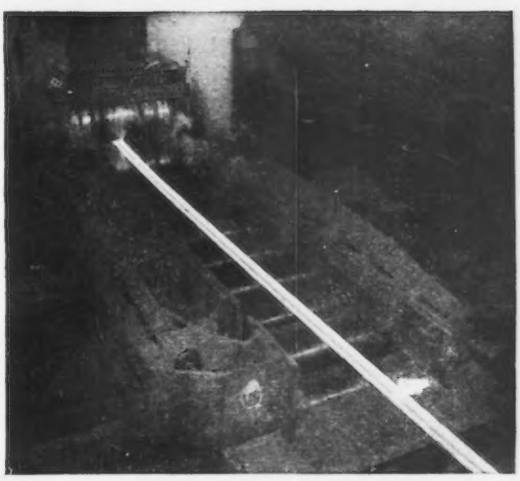
Toledo—Binney Casting Co. plans to build an additional $25,000 foundry building early in 1947. The firm manufactures molds for glass containers of food and other items.

Bucyrus, Ohio—Sozonian Vault Co. will build a factory addition at estimated cost of $24,000.

Cleveland—Cleveland Aircraft Tool & Die Co. is building a $71,000 factory and office building

Strides in Steelmaking By WISCONSIN





● Two great strides in steelmaking are *Sulfite-Treated Steel,* the more machinable steel, and *"H" Steels,* alloy steels of guaranteed hardenability.

Sulfite-Treated Steel, originated and developed by Wisconsin metallurgists, has proven itself to be far more machinable than ordinary steel even after being hardened by heat-treatment. Yet its physical properties are entirely satisfactory. In every application where machinability counts, increased production and lowered costs have been the result.

"H" Steels are alloy steels produced to your "product prescription." This means that "H" Steels have a much narrower hardenability band *guaranteed.* Wisconsin has been a leader in the development of these steels and at present is the largest producer of "H" Alloy Steels.

Wisconsin's completely integrated operations from ore and coal mines to the finished steel, staffed by top-flight steelmakers, are your assurance of excellence in alloy and special steels. Our sales and metallurgical staffs are at your service.

WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

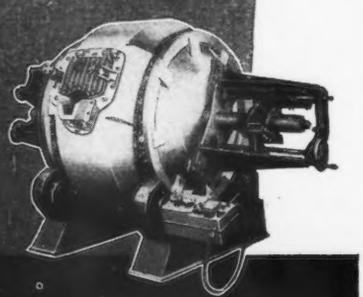
WISCONSIN STEEL OPERATIONS

IRON ORE MINES COAL MINES OPEN HEARTH FURNACES
HEAT-TREATING, COLD FINISHING AND ANNEALING FACILITIES
ROLLING MILLS ORE FREIGHTERS BLAST FURNACES

WISCONSIN STEEL

NEW Experimental and production type NP 10 kw, 10 lb. Detroit Electric FURNACE

The new Type NP, 10 Kw, 10 lb. Detroit Rocking Electric Furnace was designed to facilitate production of small pressure castings, by the "investment" or "lost wax" process. An adjustable, quick-acting device clamps molds to the furnace pouring spout for receiving molten bronze, iron, or alloy steel direct. Fast and clean, this furnace melts 6 lb. heats of brass in 6 minutes; 6 lb. heats of alloy steel in 15 minutes. A spare shell with pouring spout can be installed for experimental work or for conventional casting. The self-contained power unit is equipped with a 17 Kva, high-reactance transformer and control panel to afford the operator quick, positive control over time, temperature, and other melting factors. Detroit Electric Furnaces are made in various types, with capacities from 10 to 8000 lbs. Send us your melting requirements. We will be glad to recommend the specific Detroit Electric Furnace which will speed quality metal production in your plant.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

here. Lester Zatco is president of the firm.

Cleveland—The Gibson Engineering Co. has bought part of the wartime plant of the National Aluminum Cylinder Head Co. from WAA as the first step in a sizable expansion program. The building was acquired for $20,000. Gibson Co., which distributes and services construction machinery, plans to acquire more land in this area on which other buildings will be erected.

Cleveland—Palmer Mfg. Co., established here recently, is making a collapsible wheelbarrow. According to R. E. Palmer, president of the firm, stampings are made in outside plants, while semiassemblies are made in the company plant. Still in the blueprint stage is a design for a 7-ft, 70-lb automobile, operated with a 1-hp engine. This miniature car, priced under $100, will have three wheels and two speeds, forward and reverse. Other members of the firm are Harry E. Workman, Harold Baetz and Maurice Blye.

Toledo—The Van Keuren Metal Products Co., incorporated with a capital of $200,000, has started work on a metal plant where it will produce stampings and other metal products. Mr. Van Keuren is former owner of the Wayne Metal Products Co.

Cleveland—Ridge Mfg. Co. plans to erect an 8000 sq ft machine shop at a cost of about $15,000. The firm operates a jobbing machine shop and will operate both plants. New equipment is being purchased and additional employees will be hired.

Tiffin, Ohio—National Machinery Co. is planning a 1-story 50 x 100 sq ft addition to be used as a machine shop.

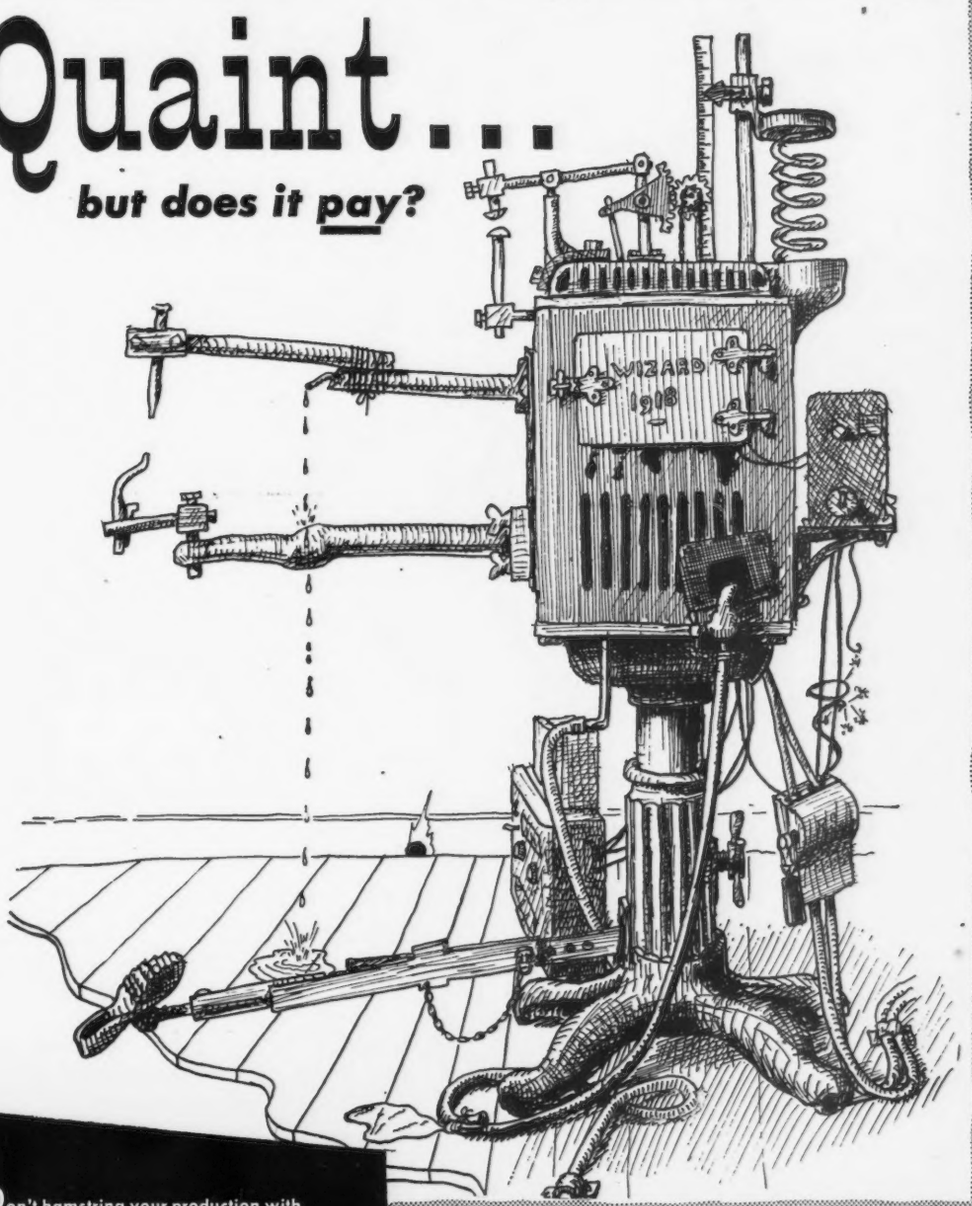
To Aid British Mining

London

• • • **Mr. Shinwell,** British Minister of Fuel and Power, said in a speech at Dudley, Worcestershire, that the British Government is going to spend $600 million in the next 5 yr to get the coal mining industry on its feet again. Electricity would be dealt with next and the gas industry afterwards. He would then be able to coordinate all forms of fuel and power, which he said would be a great stride forward in the industrial development of Great Britain.

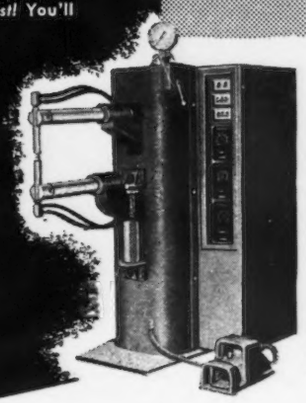
Quaint...

but does it pay?



Don't hamstring your production with out-of-date resistance welding equipment. Time and money spent on keeping ancient machines in operation, training operators, etc., is *lost!* You'll step up production . . . reduce man hours . . . stay ahead of competition with modern, completely automatic electronically controlled SCIAKY welders.

Sciaky has a complete line of standard spot, projection, portable, seam and flash welders that are *engineered for production.* We're specialists also in the design of "tailor-made" multiple gang welders. Write today for details.



If you're going to the Metal Show . . .

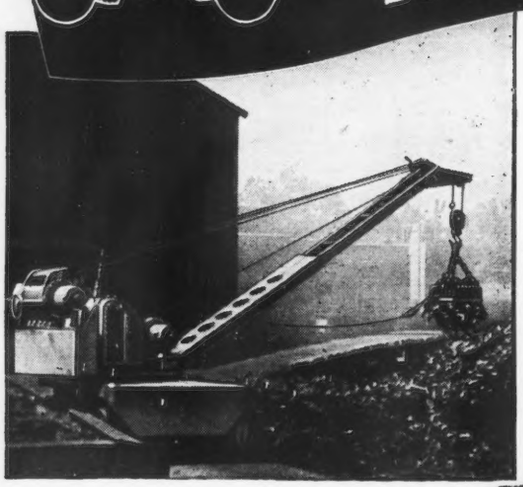
The latest Sciaky welders will be in operation at the National Metal Congress in Atlantic City, November 18 to 22. You are cordially invited to visit our booth E-220 in the Exhibit Hall.

SCIAKY BROS. Inc.

Offices and Representatives in Principal Cities

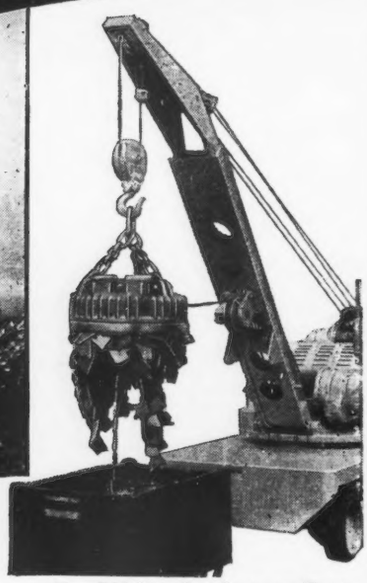
Plants in London and Paris

4913 W. 67th STREET ● CHICAGO 38, ILL.

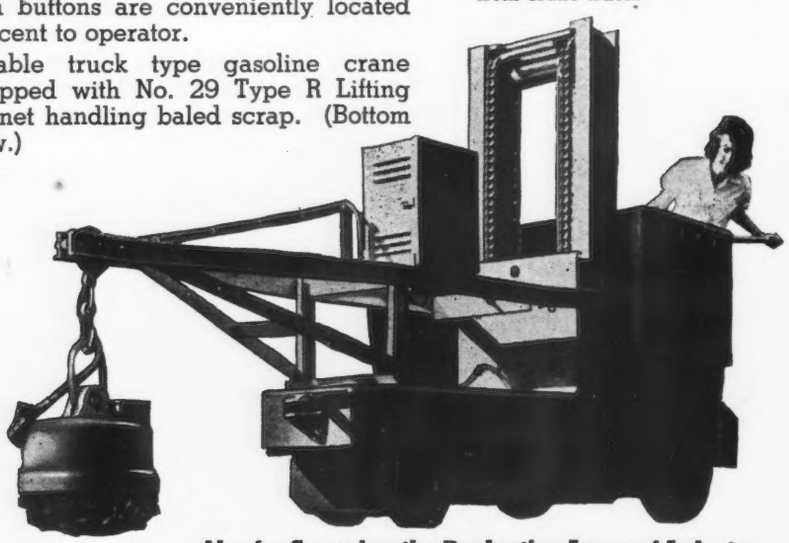


For Lifting Loose or Baled Scrap—a mobile unit. Boom can be retracted and lowered to enter box cars for loading or unloading finished material. 36-volt power-generating unit on truck crane supplies direct current for this 29-inch diameter magnet. "Lift" and "Drop" push buttons are conveniently located adjacent to operator.

Portable truck type gasoline crane equipped with No. 29 Type R Lifting Magnet handling baled scrap. (Bottom View.)



For Lifting Castings or Forgings — reaching into remote corners of a plant, this 29-inch magnet receives power directly from crane truck.



Also for Sweeping the Production Lanes of Industry—removing nuts, bolts, turnings, and other tire-injuring scrap from aisleways, between machines, from roadways, between plant buildings, etc. This 18-inch diameter magnet is operated from battery of standard high-lift truck.

EC&M Magnets Come in 10 Sizes for All Needs. Bulletin 900 gives complete data and shows many interesting installations. Bulletin 910-2M gives road-sweeping magnet information. Send for copies.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

Company Exhibits At Metal Show to Blanket All Industrial Phases

Cleveland

• • • **More than 400 companies** whose product and methods displays will cover every phase of the metals industries will participate in the National Metal Exposition which will be held in Atlantic City during the week of Nov. 18.

Exposition officials expect that approximately 15,000 persons will attend the Exposition and the National Metal Congress, which will take place at the same time in the Atlantic City Municipal Auditorium.

At the present time 57 producers of primary metals are listed among exhibitors, including primary metal producers of iron and steel, aluminum, magnesium, copper and other nonferrous metals—manufacturers of tool steels, stainless and high temperature alloys, alloy steels, and producers of bars, rods, castings, forgings and other shapes.

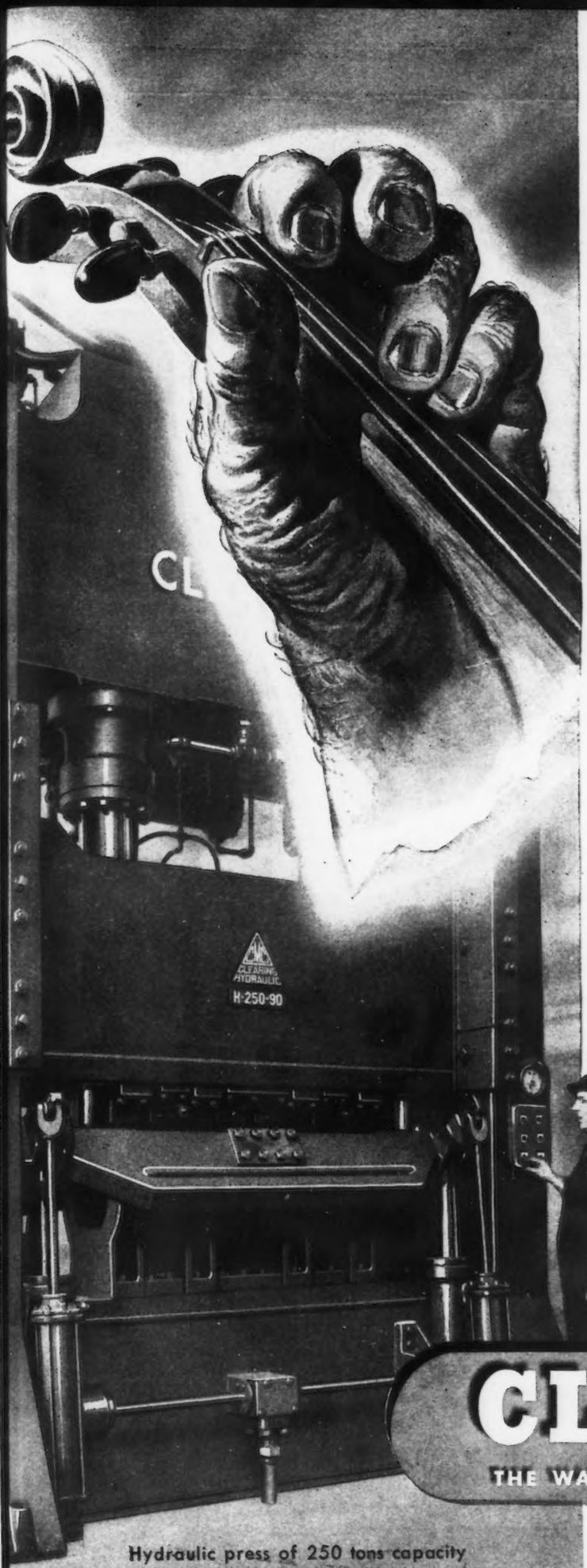
In the furnace field, 45 companies are listed, which will exhibit latest models of melting, heat treating and forging furnaces—electric, gas or oil-fired. Induction heating units will be shown by about ten exhibitors and most of them (as well as the larger conventional furnaces) will be in actual operation.

All types of welding on all types of metals will be included in the exhibits of some 50 to 60 firms in this field. One welding group, the Resistance Welder Manufacturers Assn., will occupy a section of the exposition in which 16 firms will demonstrate a wide variety of resistance welding equipment.

Forty-three instrument manufacturers, and 36 companies displaying materials and processes for metal cleaning and finishing will insure that every new development in these lines can be seen, examined, explained and demonstrated.

Heat treating equipment, testing machines, laboratory supplies, machine tools, cutting oils, all types of equipment or processes that play a part in metal production and fabrication will be represented by a number of the country's leading producers.

Nearly four acres of space (about the equivalent of an ordinary city block) will be occupied



Hydraulic press of 250 tons capacity built by Clearing for twisting crankshafts.

OVERTURE to Low Cost Production

You scarcely expect harmonious results when the huge, muscular fingers of a blacksmith assault the strings of a violin—that's a task demanding delicacy and agility, not overwhelming strength. Yet the sweetest music a cost-minded executive can hear comes from the combination of precisely these qualities in a production machine.

Everyone knows that a *press* delivers parts faster and at lower cost than any other available means of production. Conventional thinking is likely to overlook this extremely valuable asset when the parts to be produced are quite large or call for maintenance of relatively close tolerances. Clearing, on the contrary, has deliberately designed and built presses to make production dreams come true—presses of gigantic size and exerting tremendous pressures, yet so constructed as to hold tolerances unbelievably close. Such a press may be the answer to your cost problem.

When you think of Clearing presses it is well to forget previous conceptions as to press limitations. Many a Clearing press is today producing, in a single stroke, a part which formerly required much more complex and costly procedures. If you are seeking new ways to meet a coming competitive situation, Clearing engineers may be able to help you. It costs you nothing to consult us, to find out exactly what one or more Clearing presses can do to bring down your cost figures.

CLEARING

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS

DESIGNERS AND BUILDERS *of all types of* WELDING MACHINES

Ultra - Speed High Production Custom - Built Welding Machines

THE Expert Welding Machine Company, a leader in the welding industry, will continue, through constant research and experimentation, to find better, faster welding methods. Processes developed by Expert and used exclusively in Expert machines have saved many millions of production man-hours. New and better processes are on the way and it is our confident expectation to share fully in their development. Send for illustrated catalog.

EXPERT WELDING MACHINE CO.

Division of EXPERT DIE AND TOOL CO., INC.

17144 Mt. Elliott Ave., Detroit 12, Mich. Phone Twinbrook 1-4327

by these displays on both floors of Atlantic City's Municipal Auditorium, the largest hall in the eastern part of the country.

Admission to the National Metal Exposition is free to all members of technical societies and to those holding invitations distributed by participating firms. Members of any technical society can register free upon presentation of their membership cards or by presenting their business card at the registration desk in the Municipal Auditorium.

Steel Warehousemen Select '46-'47 Officers

Cleveland

• • • **Following meetings** of the Chicago and Cleveland chapters of the Steel Products Warehouse Assn., Inc., Clayton Grandy, president of the national organization, has announced the election of the following officers to direct regional activities in those areas in 1946-47:

The Chicago chapter re-elected the following incumbent officers for the coming year: Thomas J. Reid, Century Steel Corp., chairman; S. E. Hokin, Hokin Steel & Tin Plate Co., vice-chairman; D. L. Friedman, Friedman Brothers Steel Co., secretary; H. A. Greenberg, Western Sheet Steel Co., treasurer; and H. F. Alpirn, Briggs & Turivas, trustee.

Officers elected by the Cleveland Chapter were: M. S. Phillips, president, Lake Erie Steel & Blanking Co., chairman; H. J. Mervis, Singer Steel Co., vice-chairman; Thomas J. Fitzgerald, Reliance Steel Division, Detroit Steel Corp., secretary; K. V. Schwartz, General Sheet Steel Co., treasurer; and Harry Resnick, Universal Steel Co., trustee.

Mr. Grandy also announced opening plans for the Association's annual convention to be held at the Hotel Book-Cadillac in Detroit, Nov. 14 and 15.

"Without ignoring the interest of the steel warehousing industry in serving thousands of small manufacturers, convention speakers will this year place a larger accent on the correction of conditions now retarding industrial production, and the importance of private enterprise in the resumption of a free, competitive economy." Mr. Grandy said.

SELL YOUR SCRAP ★ ★ ★ ★ American Industry Needs It!

ARISTOLOY STEELS

ARISTOLOY

STANDARD STRUCTURAL ALLOY
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ALLOY TOOL
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BEARING QUALITY
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SPECIALTY
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NITRALLOY
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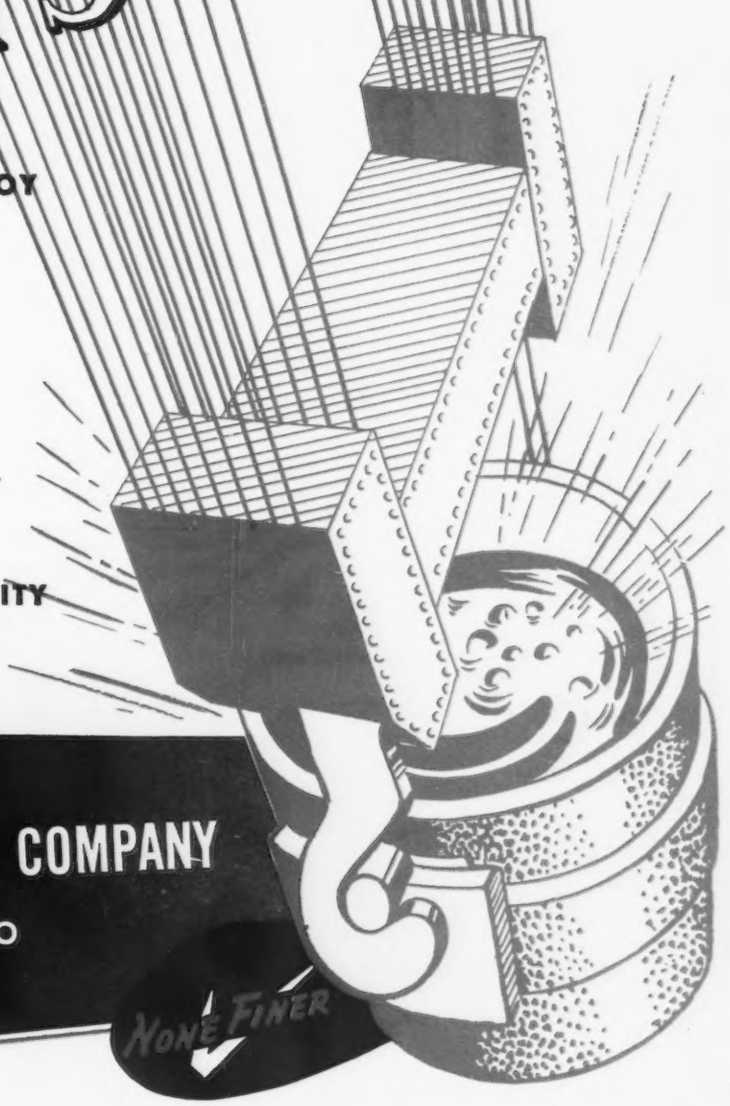
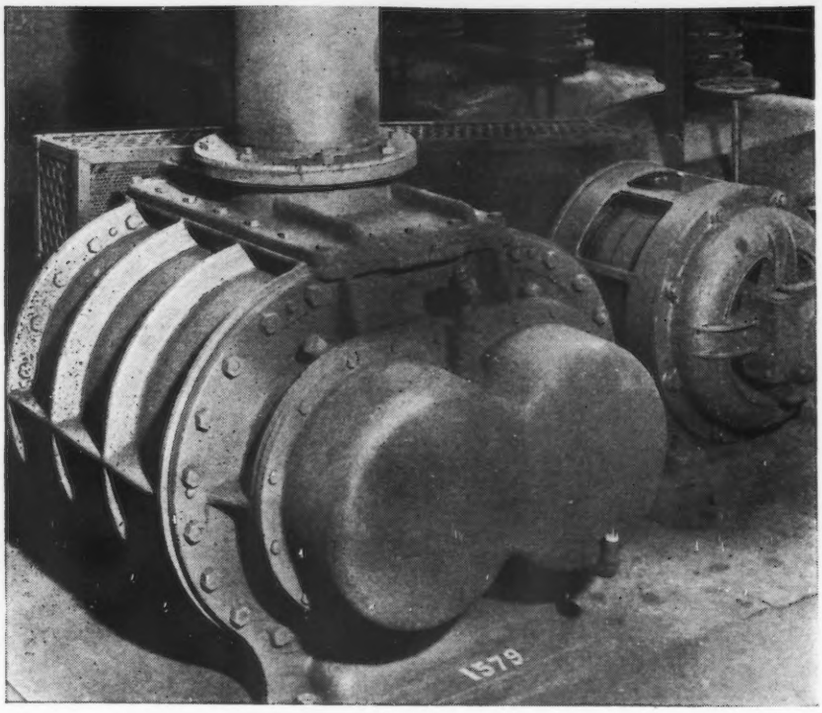
CARBON TOOL
•
STAINLESS
•
MAGNAFLUX-AIRCRAFT QUALITY



COPPERWELD STEEL COMPANY

WARREN, OHIO



TODAY IS NO TIME FOR

SHUTDOWNS!

This truism applies equally to all lines of activity today—manufacturing or mining—paper mills or chemical plants—blast furnaces or coke ovens—no matter what.

That's why the performance of this Roots-Connersville Rotary Positive Blower is proving so satisfactory to its coal mine owners. In spite of severe operating conditions in the coal-cleaning house, the blower goes right on separating coal from slate and bone. It's a rough, tough job, but the R-C unit takes it in stride.

This particular job indicated the Rotary Positive type, so that's what we recommended. However, where requirements favor Centrifugal equipment, we're equally at home there because of our "*dual-ability*" to design and build either type. Without prejudice, we judge each application on its merits, and then furnish the best blower *for you*, based on our 90 years of experience.

Give R-C "*dual-ability*" a chance to solve your problem, no matter how difficult or unusual it may be.

ROTARY POSITIVE

CENTRIFUGAL

ROOTS-CONNERSVILLE BLOWER CORPORATION

One of the Dresser Industries

611 Ohio Avenue, Connersville, Indiana

Roots CONNERSVILLE SINCE 1854

BLOWERS FOR EVERY NEED

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

Unionization Challenged By Republic Steel Corp.

Uniontown, Pa.

• • • **Republic Steel** Corp. has completed its presentation of the case against the unionization of coal mine bosses before the National Labor Relations Board. The hearing was held before an NLRB trial examiner and the case was transferred from Pittsburgh to Uniontown because of the power strike.

Republic Steel Corp. challenged the right of UMW's District 50 to organize foremen at the mine. Arguments against unionization were along the same lines as those presented by Jones & Laughlin Steel Corp., the latter case now scheduled to come up Nov. 14 before the District of Columbia Circuit Court of Appeals. This test case is being pushed in order that it will get to the Supreme Court as quickly as possible.

The mine owners contend that supervisors should not be allowed to join the same union that bargains for the miners because in doing so they will not be able to carry out their managerial duties.

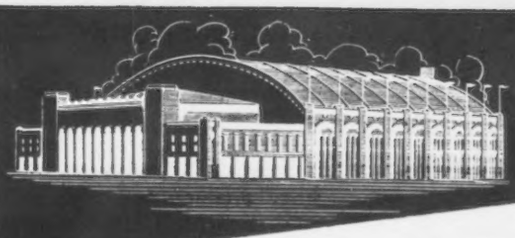
Fisher Body to Offer Cash Awards to Youths

Detroit

• • • **Scholarships and** cash awards aggregating $85,000 will be offered by the Fisher Body Craftsman's Guild to winners in its 1947 model car and model Napoleonic coach competitions.

Youths competing for awards may either design and build a model automobile or construct a miniature Napoleonic coach. In the Napoleonic coach contest, enrollees will compete for 588 cash awards and four university scholarships. Two of the scholarships total $5000 each and the other two amount to $3000 each. The awards are divided equally between the junior and senior divisions. In the model car contest embodying the youthful craftsman's own ideas in design, Guildsmen will compete for 588 cash awards and four university scholarships, two of which will bring $4000 each, the other two being valued at $2000 each.

As in 1946, the 1947 program will be divided into two age divisions. The junior division includes boys



SEE MAR-TEMP SALT IN ACTION!

Houghton will show the benefits of interrupted Quenching at Booth D-115

If you want to see what distortion will do to thin sections conventionally quenched—and how it is avoided by martempering in salt—visit our exhibit at the Atlantic City Metal Show.

We will be operating two salt bath furnaces there, to heat and quench steel strips. We'll quench them in water, oil and salt, to show you the reason for interrupted quenching.

Parts will be quenched from austenitizing temperature into a salt bath held at a temperature near the Ms point of the steel, holding the work in the quench bath long enough for center and surface to be equalized in temperature. This cushioning process avoids excess residual strains.

Agitated salt has a quenching speed approximately as fast as the customary oil quench. The salt itself is important; it must have a low, uniform melting point, to be extremely fluid in the quenching range; it must be high in thermo-conductivity, not tend to corrode the work, and remain stable for long periods. Mar-Temp Salt has those characteristics. See for yourself in Atlantic City. E. F. Houghton & Co., Philadelphia and all principal cities.

AND DON'T MISS THESE OTHER HOUGHTON HEADLINERS FOR 1947:

METAL CLEANERS

A revised line of the well-known Houghto-Clean brand of alkaline cleaners—17 products to cover every cleaning need—maintenance, ferrous, non-ferrous, electrolytic and special jobs. These embody the latest discoveries in synthetic detergents, alkalies and surface-active chemicals. See them in Atlantic City, or write us for details.

RUST PREVENTIVES

In peace, as in war, steel must be protected from its arch-enemy, RUST. Houghton has picked the "Winning Nine," a team of products adjudged best in each position, to include all exposures and types of film required. These products fill real industrial needs for temporary or long-term protection. A free booklet describes them.

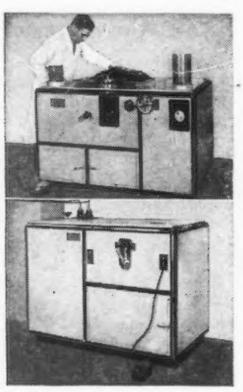
CUTTING OILS

The Houghton line of straight and soluble cutting oils and bases is complete, styled for mass production. In addition to longer tool life and finer finish, new concepts have been established—such as the antiseptic and remarkable cleansing properties of Antisep Soluble Oil, liked by all operators. Ask about these new oils, too.

HOUGHTON PRODUCTS FOR THE METAL WORKING INDUSTRIES

Gained in Pioneering the development of Industrial PRECISION CASTING EQUIPMENT

40 years of research and engineering—that's the contribution Kerr has made in helping to solve the many seemingly insurmountable problems in making precision castings for the dental profession. Today this experience and know how has resulted in the development of specialized equipment and materials for one of industry's newest and most amazing advances—the field of Industrial Precision Castings. It was a logical step for Kerr to pioneer in this new field. All units of Kerr equipment embody the highest engineering advance. Your inquiries are invited.



Here's What KERR Precision Casting Equipment Has Made Possible

1. Casting complicated parts normally requiring costly machining operations.
2. Casting of parts which cannot be machined because of their extreme hardness.
3. Casting to tolerances never before possible.
4. Casting parts and assemblies impossible to produce by present machining methods.
5. Casting of small production runs where time and expense of tooling would be prohibitive.
6. Casting parts engineered to performance and long life rather than to previous fabrication limitations.

Put KERR'S 40 Year Engineering Know How to work for you

Our best advice based on actual experience is at your service—ready to help affect a complete setup for the efficient production of precision castings to meet your individual requirements. Please call on us.

Write for booklets "Fundamentals of Industrial Precision Casting" and "Equipment and Materials".

KERR MANUFACTURING COMPANY

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from 12 through 15; those from 16 through 19 are classified in the senior group. Boys who become 16 after Sept. 1, 1946 will remain in the junior division and boys passing 19 after Sept. 1, 1946 will remain eligible as seniors.

Competition closes June 15, 1947, and field representatives of the Craftsman's Guild will go into public schools throughout the country this Fall to present the Guild program to students.

Thomas P. Archer, vice-president and group executive of General Motors, is president of the Craftsman's Guild which is sponsored by the Fisher Body Div.

Engineers Group Hears Insulation Discussion

Detroit

• • • **More than 800** members of the Detroit Section of the Society of Automotive Engineers recently heard L. M. Ball, head of the Electronics Laboratory of the Chrysler Corp. Engineering Div. discuss the subject "Heat and Sound Insulation."

Mr. Ball pointed out that four items are of primary importance in keeping heat out of automobile and truck bodies: Thermal insulation of dash and floor; sealing against infiltration of under-hood air; abundant supply of ventilating air and shielding against radiation from the exhaust system. Comparing insulating materials ranging "from rock to tissue paper" and from "chopped corn fodder to pig hair," the speaker disclosed that the range of thermal conductivities of this entire group is only plus or minus 18 pct.

"So far as thermal conductivity alone is concerned, Ball said. "the engineer could not go far wrong if he picked his material blindfolded."

According to Ball, the psychological effects of sound require constant consideration and the limitations of present instruments for measuring sound effects are well known.

Summarizing his earlier remarks, Mr. Ball pointed out that there are five basic steps in the solution of sound problems: Reduction at the source, mechanical isolation, damping of resonant elements, insulation and absorption.

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- Reciprocating Hearth
- Roll Down
- Roller Hearth
- Roller Rail
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- Drawing
- Enameling
- Forging
- Glass Fusing
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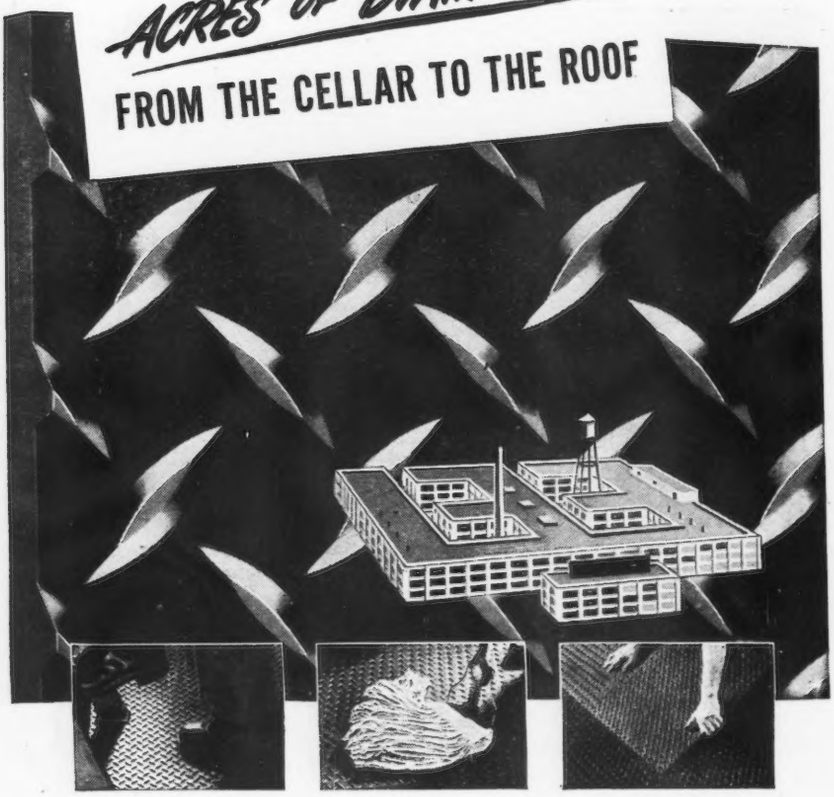
ACRES OF DIAMONDS

FROM THE CELLAR TO THE ROOF



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New Handbook Sees Increase in Mines

Toronto

• • • **The number of** companies actively engaged in mining operations in Canada has established a record according to the 1946 edition of the Canadian Mines Handbook, issued this week.

The book lists 1765 live mining companies, a figure which compares with a recent low of 554 in the 1943 Handbook, and illustrates the expansion of mining work throughout the Dominion. Of the 1765, 150 are revivals of companies dormant for years, including numerous silver operations now taking advantage of the higher price for the metal. But, showing that casualties continue to occur in the mining business, 127 operations stopped work during the year and were demoted to the inactive section.

A feature, revealed in compiling the Handbook, is that the old established companies have become more active than in years in the work of exploring and developing new properties. During the height of promotional endeavors the big organizations felt they could not compete with the prices that could be paid for properties by promoters.

Canadian Mines Handbook is published by Northern Miner Press Limited, 122 Richmond St. W., Toronto 1, Ont.

Engineers Discuss New Hydraulic Technique

Chicago

• • • **The latest** technique and approaches to problems in the field of industrial hydraulics were presented here, at a 2-day conference in the Continental Hotel, by leading educators and engineers in the field of hydraulic machinery. Sponsored by the Graduate School and Armour Research Foundation of the Illinois Institute of Technology, the conference was held in cooperation with the Western Society of Engineers and the local section of ASCE, ASME and SAE.

V. L. Streeter and O. E. Teichmann, Armour Research Foundation, presented technical papers dealing with the fundamentals of fluid flow which were co-authored by R. A. Dodge, professor of mechanics, University of Michigan. Industrial applications were dis-

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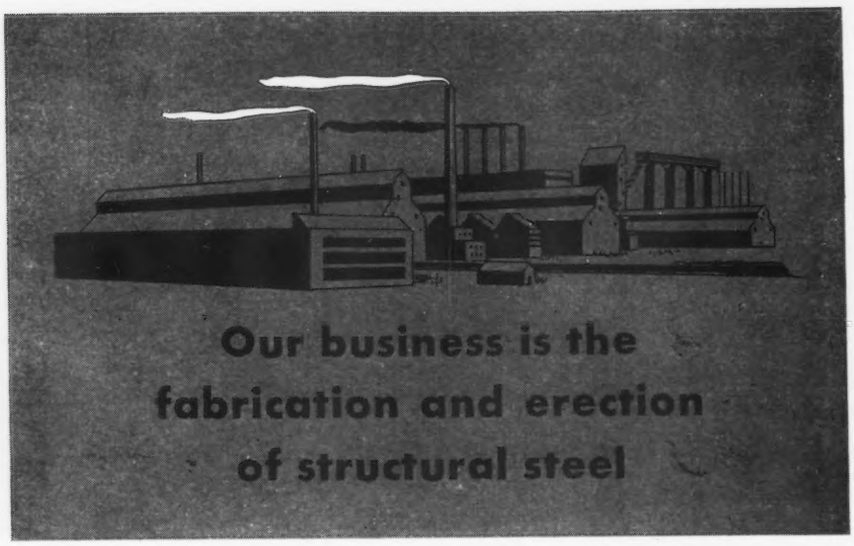

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★ **BUILDINGS . . .** Fort Pitt Bridge has an outstanding reputation and long years of experience in designing, fabricating and erecting structural steel for industrial, commercial and public buildings.

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cussed by Ransom Tyler, Oilgear Co., M. J. Taup, Vickers, Inc., and Harvey S. Pardee, consulting engineer. Hunter Rouse, director of the Iowa Institute of Hydraulic Research, was the dinner speaker.

Latest developments on fluid transmission of power were presented by E. F. Norelius, Allis-Chalmers Mfg. Co., and W. H. Marsh, Rockwell Mfg. Co. High pressure techniques and applications were covered in an afternoon session by T. C. Poulter, Armour Research Foundation, and R. E. Allen, Plastics & Rubber Products Co.

Dutch Indies' Expert To Study U. S. Industry

Washington

• • • **Study of American** industries and technical developments which might be successfully duplicated in the Netherlands Indies will be made by Dr. D. R. Koolhaas, Director of the Industrial Div., Dept. of Economic Affairs of the Netherlands Indies, according to the Office of International Trade, Dept. of Commerce.

Dr. Koolhaas, who is scheduled to arrive in the United States soon, is reported to be particularly interested in coconut oil factories, tanneries, industries processing wood and straw, basic chemical industries, canning of food products, synthetic and natural fibers, and the glass industry. American firms wishing to get in touch with Dr. Koolhaas may write to him care of the Trade Commissioner for Netherlands Indies, 10 Rockefeller Plaza, New York.

Scrap Group Elects

Birmingham

• • • **Members of the** Southeastern Chapter of the Institute of Scrap Iron & Steel reelected Moses A. Temerson, of Tuscaloosa, Ala., president. Other officers chosen at a recent meeting were Irving Levin, Jacksonville, Fla., first vice president; Louis Cline, Nashville, second vice president; Max Kimerling, Birmingham, third vice president, and John K. Travis, Birmingham, secretary-treasurer.

Albert Wynne, Birmingham, J. B. Chinn, Birmingham, Henry Koplin, Macon, Ga., Jack Rosenbaum, Pensacola, Fla., and William Breman, Atlanta, were named to the chapter's executive committee.

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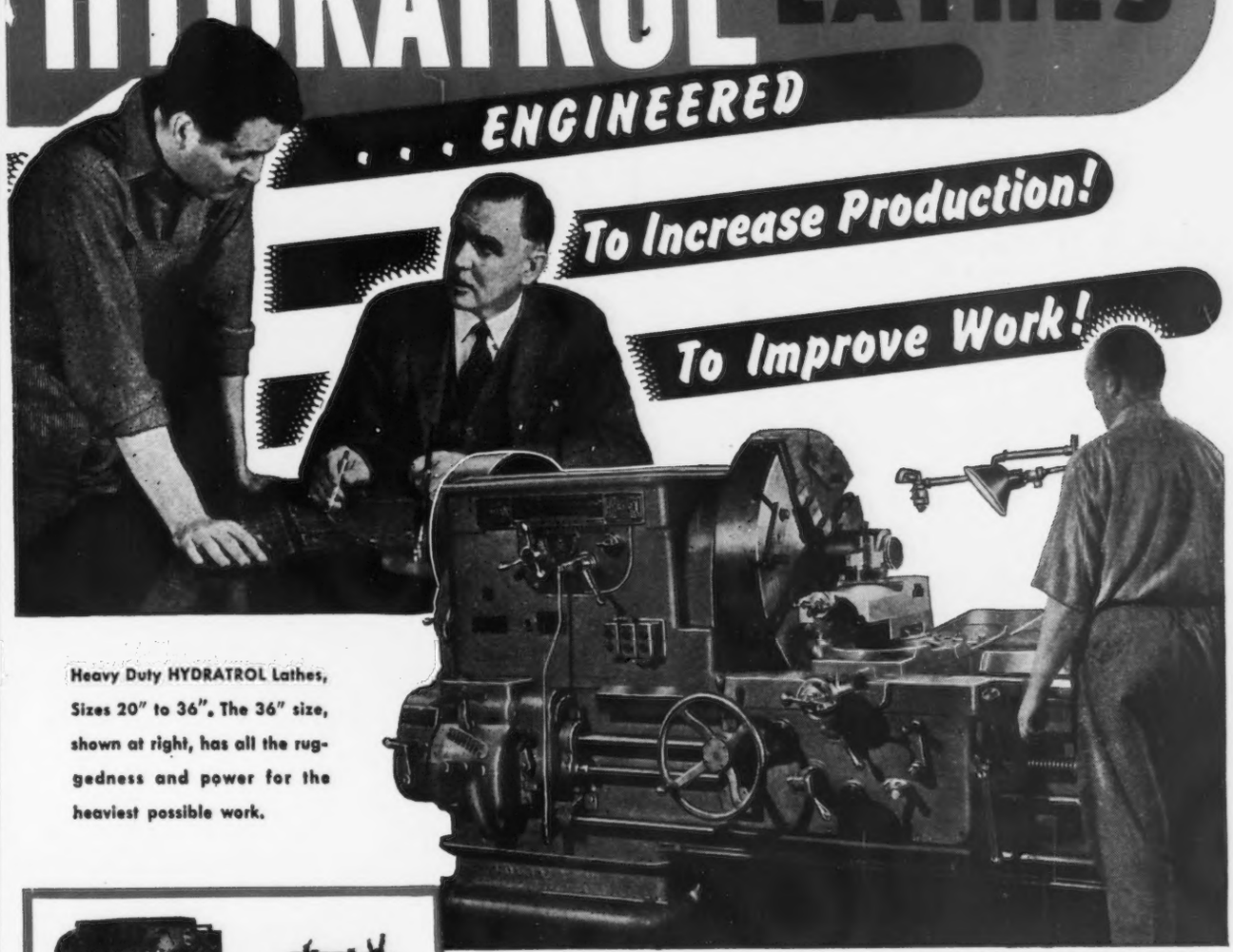
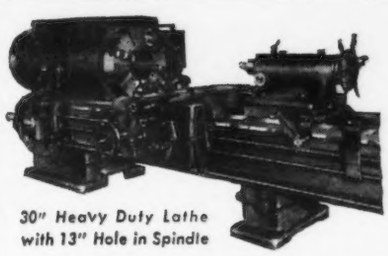
. . . ENGINEERED To Increase Production! To Improve Work!



Heavy Duty HYDRATROL Lathes, Sizes 20" to 36". The 36" size, shown at right, has all the ruggedness and power for the heaviest possible work.



30" Heavy Duty Lathe with 13" Hole in Spindle

LARGE HOLLOW SPINDLE TYPE

5 SIZES—18" to 36"

Small	18" up to 7⅛" Hole
Medium	24" up to 12⅛" Hole
Large	27" up to 13⅛" Hole
Large	30" up to 14⅛" Hole
Large	36" up to 16½" Hole

(Standard type lathes, 16" to 36")

Do It Better - on a HYDRATROL!

IN hundreds of plants — under all sorts of conditions — LEHMANN HYDRATROL LATHES have invariably brought about faster production, better work, lower costs.

Look around your own shop — you may find a number of machining jobs which possibly could be done *better* on a Heavy Duty Type of HYDRATROL LATHE, as pictured above. Send us prints of these unusual, difficult, or too-costly machining jobs, for a specific, time-and-money-saving recommendation.

MOVIE SOUND FILM, in natural colors, available, showing functions of Hydratrol Lathe, advanced construction features, and production machines in operation. Ask the Lehmann representative for a showing.

Lehmann MACHINE COMPANY

CHOUTEAU AT GRAND . . . ST. LOUIS 3, MISSOURI

Blades made for the job COST LESS

Only from a complete line can you be sure of getting the blades that cut cleanest, fastest, longest on *your* work.

The Victor line is *complete.* And your Victor supplier can help plenty in advising "which blade for what use." See him. And for further money-saving help, ask him for Victor's booklet of hack saw hints. There's a copy waiting for you, free.

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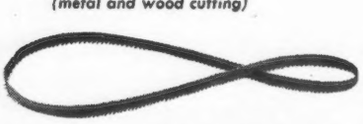
• BAND SAWS
(including skip-tooth)
(metal and wood cutting)



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Lloyd's Register Shows Shipbuilding Tonnage Nears Record Level

London

• • • **Lloyd's Register** reveals that 2,099,963 net tons of merchant shipping was under construction in the United Kingdom at the end of September, one fifth of the ships being for export. This total brings postwar British shipbuilding near to the record level of 2,149,844 tons reached in June 1922, which has not since been surpassed. Tonnage of the 464 ships now being built is 424,071 tons more than at the end of September 1945.

Of the 3,997,458 net tons of merchant vessels under construction throughout the world (excluding Danzig, Germany, Japan, Poland and Russia for which figures have not yet been obtained), 52.5 pct is being built in Great Britain and Ireland, and 47.5 elsewhere. The United States maintains its lead as the largest shipbuilding country outside the United Kingdom with 396,796 tons at the end of September, followed by Sweden with 269,976 tons; British Dominions, 223,504 tons; Holland, 186,804 tons; Italy, 186,773 tons; Denmark, 163,260 tons; France, 154,762 tons; Spain, 106,405 tons; Belgium, 99,864 tons; and Norway, 92,907 tons.

There are 70 steam and motor oil tankers of 1100 net tons and upwards under construction in the world, totaling 650,140 tons, which consist of 15 steamers of 143,570 tons and 55 motor ships of 506,570 tons. The statistics show an increase in the proportion of oil burning ships being built as compared with coal burning vessels.

Although at the end of September 1945 there were under construction 241 steamers of 917,234 tons, compared with 202 of 1,064,530 tons at the end of September this year, the number of motor ships being constructed has risen over the 12-month period from 132 vessels of 749,479 tons in 1945 to 223 of 1,020,708 tons at the end of September 1946.

Lead Producers Still Seek Price Increase

New York

• • • **Despite the firm** statement denying a price increase for lead or lead scrap "during the foreseeable future" made by the OPA Administrator only two months ago, members of the industry have begun an attack on the price structure for the metal which is claimed to be the cause of the severe shortage. Kenneth C. Brownell, vice-president of the American Smelting and Refining Co. and Irwin H. Cornell, vice-president of the St. Joseph Lead Co. have given voice before the Primary Lead Producers' Advisory Committee to the underlying discontent with price and supply that has been plaguing producers and consumers.

It is estimated by Mr. Brownell that 1946 lead consumption will reach 870,000 tons comprised of new lead and scrap, 770,000 tons; reduction of industry stocks, 60,000 tons, of government stocks, 40,000 tons. This tonnage is believed to be only 70 pct to 80 pct of the tonnage which could be used if freely available at the current ceiling price. However, it was stated that the current foreign price of 10.25¢ per lb f.a.s. Gulf Ports, when import duty and transportation costs are added would be 11.6725¢ per lb at New York. Mr. Cornell estimates that purchase of foreign lead in 1946 will be less than half 1945 import tonnage, and observes that the government is the only buyer permitted to negotiate foreign purchases.

It is the opinion of Mr. Brownell that price decontrol and private importation of lead should improve the supply of new lead from 770,000 in 1936 to 950,000 tons in 1947. This will be comprised of 330,000 tons from scrap, 475,000 tons from ore, 150,000 tons from imports. With the increase in supply as estimated and a reduction in demand because of higher prices, it seems to Mr. Brownell that a balance in supply and demand could be worked out at an early date. However if the decontrol is postponed until Mar. 31 next year, it is predicted that the time required for readjustment may be extended appreciably.

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MOVABLE STEEL PARTITIONS

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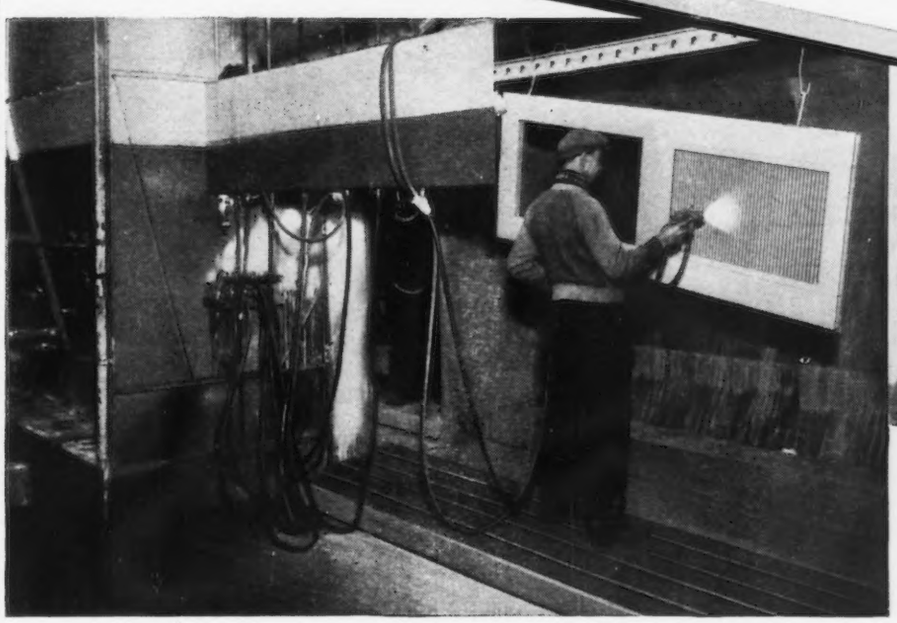
DeVilbiss Water Wash Spray Booths and a complete assortment of DeVilbiss Spray Equipment speeds up the finishing line at The E. F. Hauserman Company.



Hauserman erectors installing a 3'-6" x 10'-0" steel partition unit in a recently-completed laboratory job. Units quickly clip together. Inner wiring raceways, visible at bottom of unit, will later be covered with finished outer base.

Like other leading manufacturers in every industrial field, The E. F. Hauserman Company of Cleveland, Ohio, depends upon DeVilbiss Equipment exclusively to spray-finish their Masterwall movable steel partitions and wall linings.

Evidence that Hauserman is enthusiastic over their new equipment is found in the remarks of Mr. Cahoon, their Plant Engineer. According to Mr. Cahoon, the new DeVilbiss installation has speeded production, made working conditions more pleasant and healthy for spray operators and has considerably reduced the frequency of booth cleanings. Furthermore, a saving of $30.00 to $50.00 per day is expected through the salvaging of overspray when full production is reached.

Prominent manufacturers everywhere experience this typical outstanding performance with DeVilbiss Equipment. For equipment to produce high quality finishes at low cost, consult your DeVilbiss engineer.

THE DEVILBISS COMPANY, Toledo 1, Ohio

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means **Quality** *in all four . .*

SPRAY EQUIPMENT
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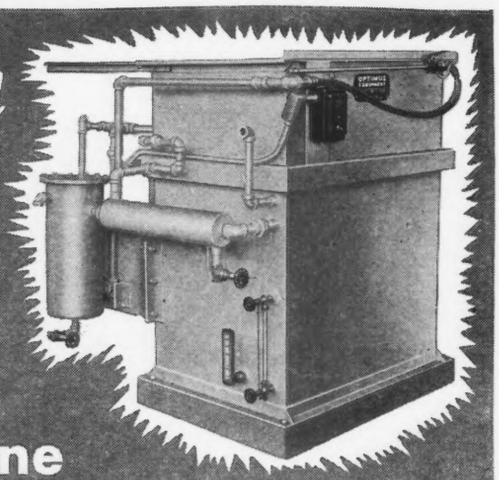

a new complete line of Metal Parts DEGREASERS

Type OP-1-40 OPTIMUS Vapor-Spray Type Degreaser. Designed for use with trichlorethylene. Installed to degrease metal parts prior to plating. All parts of unit hot galvanized after fabrication. Heating and cooling coils readily removed. Unit acts as a still to recover salvaged solvent. One of a series of standard OPTIMUS models.

To adequately round out and complete its line of Metal Cleaning and Drying Equipment, the Optimus Equipment Company announces the manufacture and marketing of a full line of Metal Parts Degreasers.

This new equipment, which has been carefully engineered to include the latest developments in the field of vapor degreasing, will cover a wide range of applications. Equipment will be available embodying a varied number of cleaning cycles, including Vapor, Vapor-Spray, Liquid-Liquid-Vapor, Liquid-Vapor, as well as combinations of these and the use of supplementary pump and spray washing facilities, to meet special requirements.

Investigate the production savings which vapor degreasing may make possible in your metal finishing operations. Let OPTIMUS engineers submit an equipment plan specially designed to fit your needs, embodying the use of standard or special models.

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Write today on your business letterhead for your copy of new illustrated bulletin No. 6E1, describing OPTIMUS Equipment and Dependable OPTIMUS Detergents for modern metal parts cleaning operations.

SOLVENTS FOR VAPOR DEGREASERS—The solvents, Trichlorethylene and Perchlorethylene are available to OPTIMUS Equipment users and others in the metal finishing field, supplied from our several conveniently located warehouses.

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OPTIMUS EQUIPMENT

FOR CLEANING · RINSING · DEGREASING · PICKLING AND DRYING OF METAL PARTS

Industrial Pact Signed By Yugoslavs, Czechs

London

• • • **Yugoslavia and Czechoslovakia** have recently signed a commercial agreement for the exchange of goods of fundamental importance to the reconstruction and economic development of both countries.

Czechoslovakia will export to Yugoslavia industrial goods, machinery, transport, vehicles, and various chemical goods, in return for ores, metals and agricultural products. It is understood that prices will be arranged by the exporters and importers concerned, and both countries will set up special offices to implement the clauses of the agreement which is valid until August 31, 1947.

Puts Controls on Copper

Washington

• • • **CPA has placed** the same control on receipts of copper and copper base alloy scrap by dealers and brokers as it applied recently to receipts of ferrous scrap by dealers and brokers. Under the CPA direction, no dealer or broker may accept shipments of copper and copper base alloy scrap in any one month unless he reasonably expects to ship such receipts or their equipment in the succeeding two months.

Ministry to Hold Sales

London

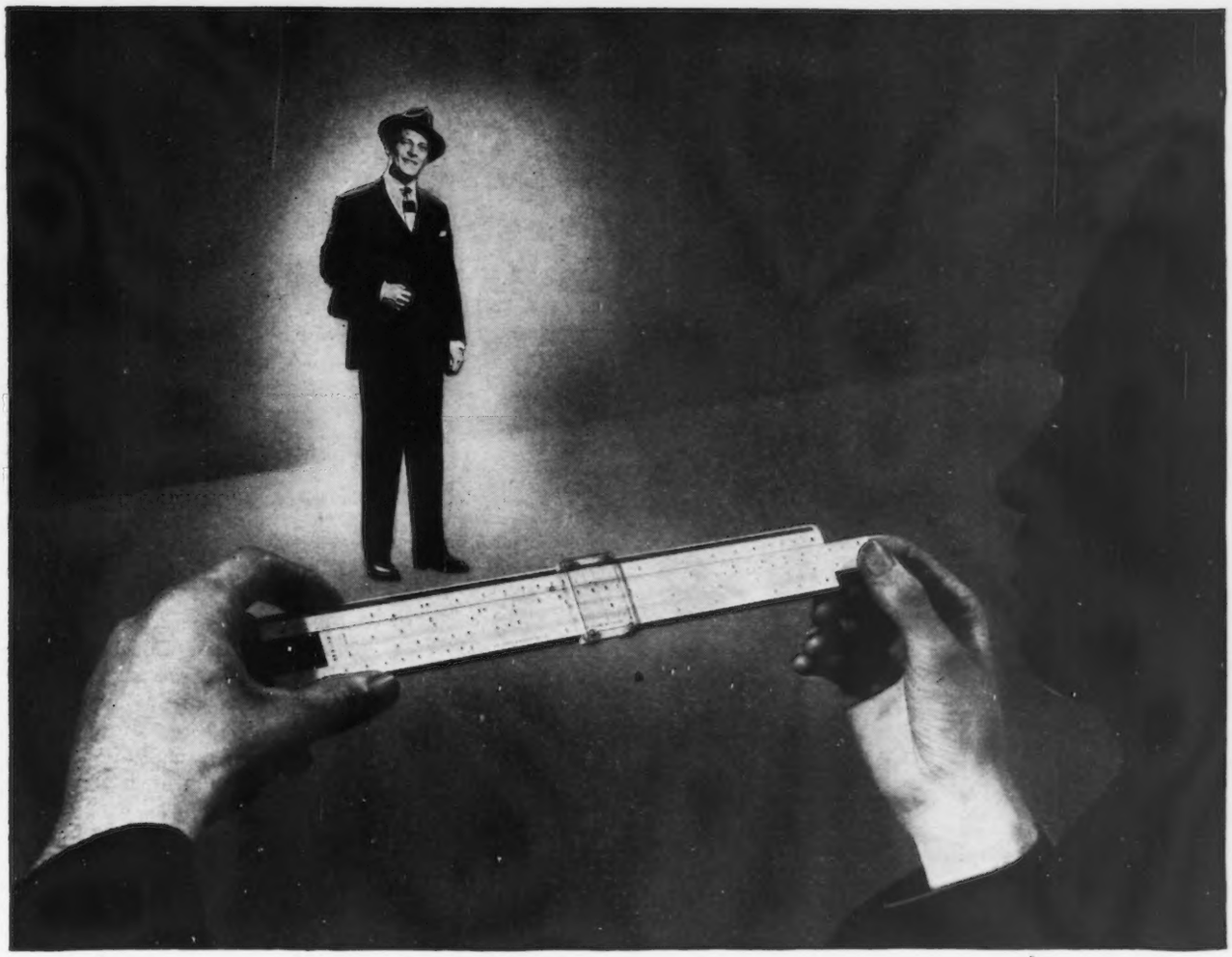
• • • **Fifty auction** sales are to be held throughout Great Britain by the Ministry of Supply between now and next March to speed up the disposal of large stocks of miscellaneous surplus stores, including industrial and engineering equipment but not machine tools.

Goods to be disposed of include hand trucks, petrol engines, industrial pressure gages, gas heated furnaces, hand and petrol driven pumps, and a wide range of other stores.

Ship Bids Delayed

Washington

• • • **Opening of bids** for purchase for scrapping of 15 over-age merchant ships now moored in the Mobile River reserve fleet, was postponed from Nov. 6 to Nov. 13, the U. S. Maritime Commission has announced.



How do you evaluate your supplier?

WILL the product do the job? Will you receive the material in good condition? Will you get what you ordered? What kind of delivery can you expect? What is the supplier's past record?

These are some of the factors which should help you evaluate the worth of your supplier. Consider, too: the courtesy of the salesman who takes the order . . . how quickly he can give you information you need . . . his understanding of your problems . . . and his effort to help you earnestly.

We, in the Levinson organization, understand the importance of these vital factors in your everyday buying of supplies. Those in the habit of dealing with Levinson Steel Sales know that the answers to these questions are not merely a problem to us—they are a lifetime policy.

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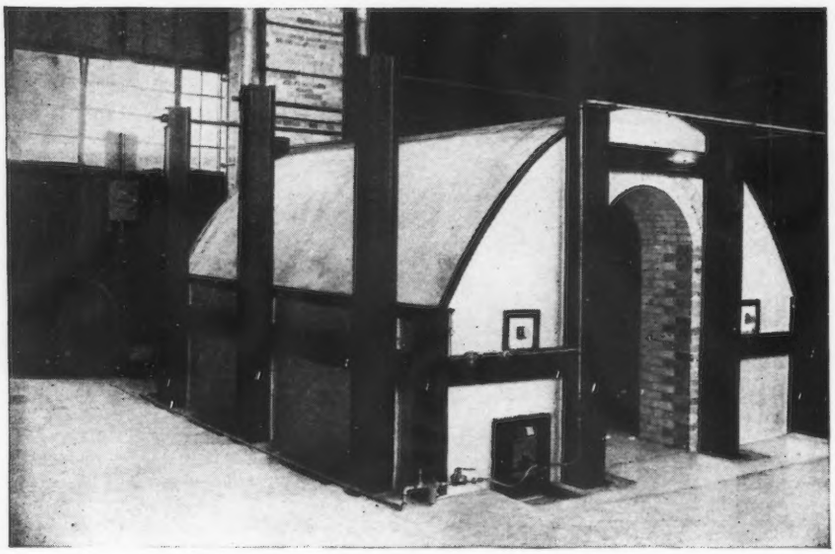
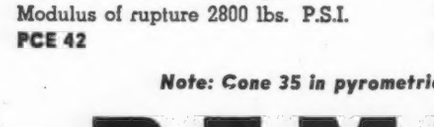
REINFORCING BARS . . . *also* APS PLASTEEL ROOFING · BATES OPEN STEEL FLOORING · THORN STEEL WINDOWS

TWO NEW SUPER REFRACTORIES FIRED TO CONE 35



Kiln for firing Remmey 99AD & Crystalite A Refractories to Cone 35

REMMEY 99AD BRAND
Over 99% Alumina



REMMEY 99 AD BRAND made of pure chemically precipitated alumina, without clay bond. Analyzes over 99% Corundum.

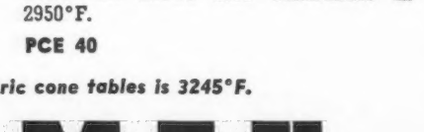
Corundum, the crystalline form of alumina, is more resistant than any other refractory oxide to many types of slag.

Firing to Cone 35 makes Remmey 99 AD Refractories hard and tough.

Modulus of rupture 2800 lbs. P.S.I.

PCE 42

CRYSTALITE A BRAND
Recrystallized Mullite



CRYSTALITE A BRAND is fired to Cone 35 to produce a composition closely approaching an all Crystalline Mullite Body. Due to this Crystalline Structure "Crystalite A" Refractories are highly resistant to glass furnace slags and other destructive slags.

Load test shows zero subsidence at 2950°F.

PCE 40

Note: Cone 35 in pyrometric cone tables is 3245°F.

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Machinery Firms Employ Third of All Workers In Cleveland District

Cleveland

• • • **Almost one out** of every three workers engaged in manufacturing in the Cleveland labor market area in September was employed by a machinery producing firm, according to a U. S. Dept. of Labor survey of employment trends in the machinery industry here.

The survey showing total employment in the machinery production industry in this area was estimated at 78,550 in September, about 21 pct below the wartime peak of June 1943 and more than double the prewar level of April 1940. Nonelectrical firms employed approximately two thirds of the total workers within the industry.

There has been a steady and gradual rise in machinery production employment during the past 12 months, with the exception of minor declines in November and February. September employment according to the survey, was 1.1 pct above August and 8.6 pct above the level of 1 yr ago. Largest gains were reflected in nonelectrical machinery firms.

Increased demand for products has been reflected in employment gains in almost all firms providing employment data. In September, 37 of 64 machinery production firms employing a total of 66,721 or 84 pct of the estimated total employment within the industry, reported employment gains of 1144 over August. Female employment rose 1.4 pct to 15,636.

Losses in 27 firms totaling 336 were negligible. Largest September gain over August was reported by 19 nonelectrical machinery (except metalworking) firms, who increased employment by 544. Twenty-eight metalworking machinery firms added 46, while 17 electrical machinery producers stepped up 218.

Indicative of the change in the stature of machinery production in Cleveland industry, in April 1940, one worker out of every five engaged in manufacturing was employed by a machinery producing firm, as compared with the September 1946 ratio of slightly less than one out of three. The same proportion existed during the

wartime machinery peak of over 100,000 in June 1943. According to the U. S. Dept. of Labor survey, it is considered significant that this ratio has remained almost constant during the past 12 months.

Accelerated production schedules characterize the machinery producing industry. Increased demand for products, the survey showed, was typical in the majority of firms.

"It would appear that material shortages have not affected the industry's potential for growth, although production in a number of firms has been delayed due to shortages of lead, steel, copper, castings and scrap iron," the survey states. A slight increase in labor turnover was evidenced in the 64 firms with a 3.8 separation rate in June rising to 4.2 pct in August.

From September to November, the estimated labor needs of the 64 firms were 1521 additional workers of whom 339 were women. With a 2.3 pct increase anticipated during the 2-month period, only six firms forecast decreased employment. Approximately two thirds of the workers will be utilized in nonelectrical machinery production.

According to the survey, further expansion of the work force is anticipated by January 1947. Firms providing data project a need for 2200 workers from September to January, with women comprising 479 of the total. Three fourths of the total demand will be required in nonelectrical machinery production, although more than half of the gains in female employment are expected to go to electrical machinery firms.

Employment in metalworking machinery firms is expected to remain stabilized or to undergo slight gain.

Increases in employment will be primarily in the semi-skilled and unskilled categories. However, the survey states, such expansions usually hinge upon the procurement of key workers in certain skilled occupations. As of Oct. 1, 1946, applications of skilled workers on file with the U. S. Employment Service totaled only 1982 as compared to unfilled job openings of 1686. While these figures do not represent the total supply and demand, they are thought in-

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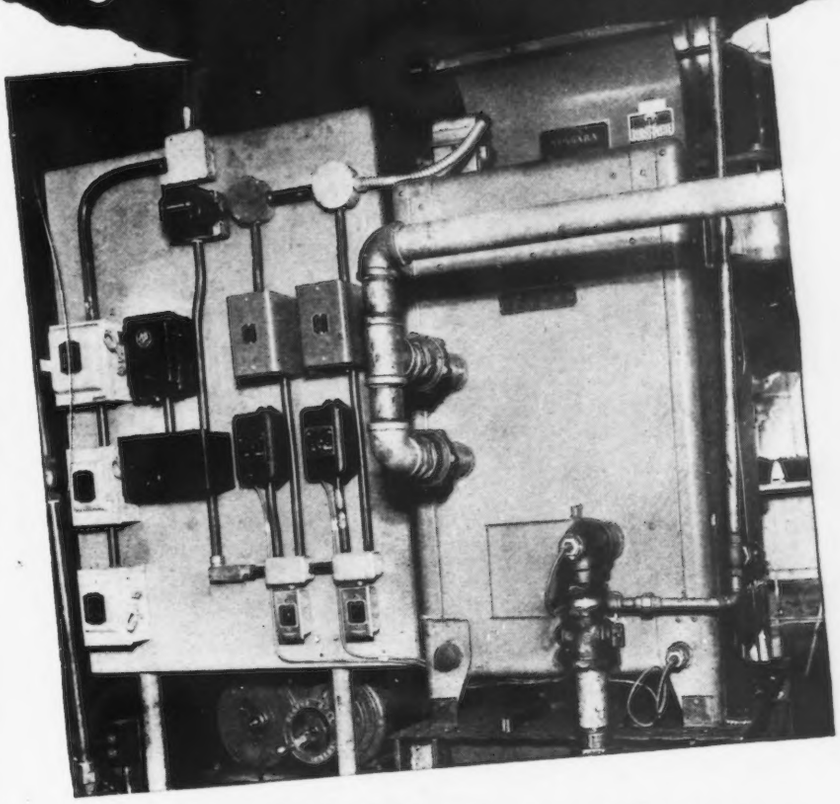

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dicative of the growing stringency of skilled workers.

A detailed analysis of applications and job openings in a few skills utilized by machinery manufacturers emphasizes the acuteness of labor shortages in specific skills. As a case in point, on Oct. 24, 1946, the USES held job openings for 105 machinists, 98 tool and die makers and 68 engine lathe operators. Applications in these occupations amounted to 14, 15 and 25 respectively.

Of the 54 workers in the three occupations, 20 are 60 yr of age and over, 11 are not available presently due to physical handicaps necessitating a change in occupation or a desire to change occupation. The remaining 23 include workers who are limited by lack of experience or are selective as to place and type of employment.

With no immediate supply available, the survey states, USES in filling orders must depend upon the current release of such workers from other employment.

Scorns Workers Control Of British Industry

London

• • • **Sir Stafford Cripps,** president of Britain's Board of Trade, said in a speech at Bristol that British industry controlled by the workers was at present an impossibility. He stated that on many occasions he had tried to get representatives of the workers on all sorts of bodies and working parties, but that it had always been extremely difficult to get enough people who were qualified to do that sort of job. "Until there has been more experience by the workers on the managerial side of the industry," he said, "I think it would be almost impossible to have worker-controlled industry in Britain, even if it were on the whole desirable."

Sir Stafford went on to say that Britain was gradually getting back to something approaching normalcy in trade relationships with several countries. He was glad that an amicable arrangement had been reached with Russia "about many outstanding points which were making it difficult for Britain to embark on any fresh trading negotiations."

AMA Studies Annual Reports to Set Basis For Best Presentation

New York

• • • **Annual reports of** U. S. companies, devoting more attention than ever before to factual, analytical explanation of specific business operations, are becoming an increasingly effective means of acquainting stockholders, employees and the general public with business problems and methods.

This is among the conclusions of a 103-page study of hundreds of representative annual reports of recent years made by the American Management Assn. and released today to its members. The study, a guide in annual report preparation, assembles and analyzes the experience and best techniques of accountants, auditors, company presidents, treasurers, public relations executives and other management personnel.

Among the criteria of good annual reports, the AMA study lists: (1) Completeness, interest and clarity of explanation; (2) illumination of economic concepts important in the relationships of the company to its various "publics"; (3) the effect of changes in the purchasing power of the dollar on financial statements; (4) proper presentation of profits; (5) detailed explanation of the nature and data of accounting; (6) use of the best methods of presenting the major items on the balance sheet and income statement; (7) use of new accounting aids in presentation; (8) attention to employees' interest and company relations to them; (9) improvement of stockholder relations; (10) proper preparation, printing and distribution.

The study states that the first job in the study of annual reports is to find out the most important "publics" of the company and their chief interests. It reports that the interest of the stockholder before the war was in "how much did we make and how did we make it?" and today is "how much did we make and where are we going?" It also reports that employees and unions are interested in much the same information as stockholders. The report lists in detail those topics found to be of most interest and

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discusses ways of treating them in the most readable manner.

The following is a summary of comments in the study on what are termed the 10 most important considerations in formulating a report:

(1) Completeness, interest, and clarity of explanation: No annual report fulfills its functions properly without these qualities which are detailed at length in the AMA study in connection with various types of business problems. The association study shows, however, that in some cases "completeness can be carried too far," giving a false impression of accuracy in presenting financial data. For example, it points out that the professional accountant is the first to admit that presentations of financial data accurately down to the last cent are in reality estimates only which might be accompanied by some indication that the data are approximate and, if possible, information on how approximate.

(2) Explanation of economic concepts important in the relationships of the company to its various publics: A number of companies show how income remaining to employees, stockholders and reinvestment in the business, after deduction of all other expenses, goes largely to the employees, in many cases apparently as much as nine-tenths of this so-called available income. Ways are then discussed how to increase employees' income. In this connection stress is laid on the aid of capital to labor productivity. Attention is also devoted to methods by which the employees themselves can increase productivity, in one or two instances supported by a statement of the president of the international union.

(3) Effect of changes in the purchasing power of the dollar on financial statements: The AMA study found no detailed discussion in annual reports of the effect of the dollar's changing value on financial statements. It points out that the reduction of the purchasing power of the dollar has had an especially profound effect on the cash and bond holdings of corporations, on amortization and interest payments. Since the buying power of the money expended by corporations on the purchase of goods and services may have been worth more than that of the sales dollars they received, the profits shown in many annual reports may well have been

less, or may have actually been losses. Thus if a firm is visualized as paying 10,000 "full" dollars and receiving 15,000 "half" dollars, the loss is obvious and a fact of vital importance in company relations.

(4) Proper presentation of profits to remove misconceptions: According to one survey quoted two thirds of the workers interviewed thought that companies pay more money to their stockholders and top management than to their workers. Only one fifth of the employees in another survey based judgment of their own company's profits on management reports. Accounts explaining profits are given in AMA's report—the nature of profits, definition, and the presentation of profit data, including graphic presentation.

(5) A more detailed explanation of the nature and the data of accounting: The exaggerated impression of the accuracy of annual reports on the part of readers might be tempered by explaining the limitations of accounting which arise from difficulties of valuation and the high degree of judgment involved in it, from the attempt to match the revenues with the corresponding costs over a relatively short period of time (the problem of the cut-off), and the difficulties created by definitions and accounting terminology.

(6) The best methods of presenting the major items on the balance sheet and income statement: For example, current misconceptions of the term surplus are listed and detailed explanations of surplus by source and use are made. The report stresses the important aspects of the discussion of inventories, depreciation, and intangible assets. Much space is devoted to the presentation of financial statements in a simplified, yet accurate, manner.

(7) Use of new accounting aids in presentation: The AMA study discusses new developments of techniques clarifying financial statements, as for example comparative statements, uniform accounting, statements showing the sources and application of corporation funds and ratio analysis.

(8) Attention to employee interest and company relations to them: The study found an increasing tendency to publish the same report to employees and stockholders, in order to avoid suspicion, lack of interest and resentment. On the

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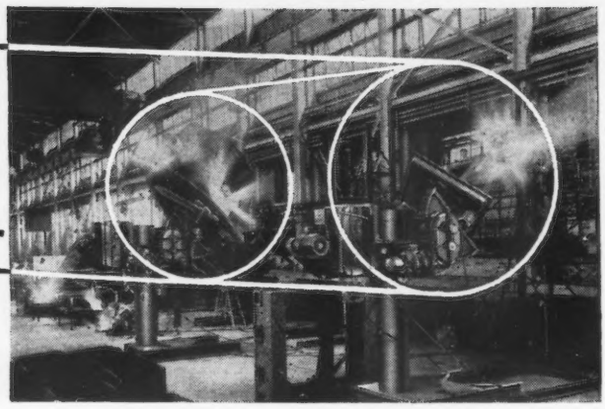

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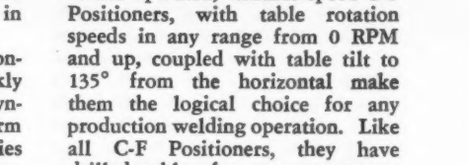

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other hand, some employees were found to point out that they are interested in subjects and emphasis different from that of stockholders. As one worker said of a company president's special employee report: "A fellow can understand this report. But the stockholder report is for the big shots." Many companies give an account of benefits provided to employees, provisions for safety and personnel policies. On the whole, there is less tendency to indulge in generalities and writing down on the subject of employee relations.

(9) Improvement of stockholder relations: AMA quotes a statement made some time ago by its present Board Chairman, John M. Hancock: "I believe that stockholders are the backbone of American business. I believe the management which places their interest first in a truly self-enlightened interest with the long-range view will do the best job for all concerned and gain the greatest reward."

Annual reports were found to assign a more prominent place to stockholders in the belief that they form an important segment of public opinion and votes, and that a more democratic participation on their part is desirable. A more fruitful direction of capital might be furthered by more informative reports. An analysis of AMA of stockholder surveys showed that among financial topics profits, sales and cost analysis, taxes, depreciation and management compensation were of major interest. And there is comparatively more interest in an analysis of the future rather than the past and present. Many techniques of improving stockholder relations are presented, including methods of discussing company policies.

(10) Proper preparation, printing and distribution of annual reports: Preparation of good annual reports often needs to be started 6 to 7 months before their final release. The cost of printing and mailing reports was stated to be in a number of cases between 25¢ and 35¢ a copy. It was found that a majority of companies had anywhere from 5 to 25 illustrations and a number of graphs. One third of the reports examined were 8½ x 11 in. in size, four fifths ran 16 to 36 pages. New techniques of distributing annual reports are discussed; the use of the annual report adver-

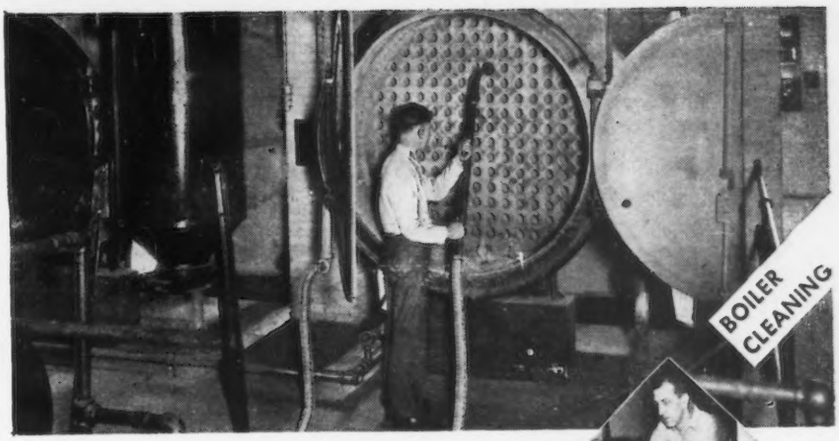
tisement is found to be increasing.

Other comments of interest made in the study follow:

"While it is true that some of the upper bracket stockholders can read a financial statement more intelligently than the employees can, it is quite likely that in many companies the 'average intelligence' of employees is about the same as that of the stockholders, considering the spread of education and the growing consciousness of economic problems."

"Some companies with outstandingly good (and some with outstandingly bad) records in labor relations make no mention of them at all, although employee relations are of obvious interest to stockholders, especially as they affect labor productivity, wage demands, labor strife—matters that may influence earnings decisively. A survey showed that 45 pct of those whose opinions were gathered wanted a statistical analysis of employee relations. This reveals, perhaps, a lesser interest in actual and detailed data than in general outlook and interpretation. When the report is addressed to stockholders and employees a detailed discussion of relations between the firm and its employees appears to be necessary."

"Basically, unions are interested in much the same information as stockholders. They want illuminating balance sheets and income statements. They want to be able to understand them. They want informative narratives. Like stockholders, they are suspicious of what they call the tricks of accounting. Clarification and explanation of the nature of financial and nonfinancial items in the narrative may help to dispel some of the misapprehensions about hidden profits in the valuation of inventories and fixed assets and in reserves, especially the belief that opening the corporation's books would justify the union's demands. Actually, unions could and probably do frequently get most of the existing financial data relating to their company for careful analysis of the annual reports, by union accountants, through perusal of trade publications and trade contacts and through additional information disclosed to the SEC in registration and annual statements."



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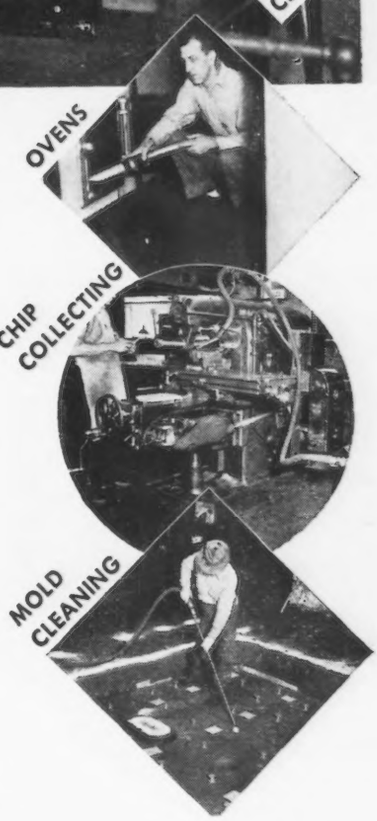

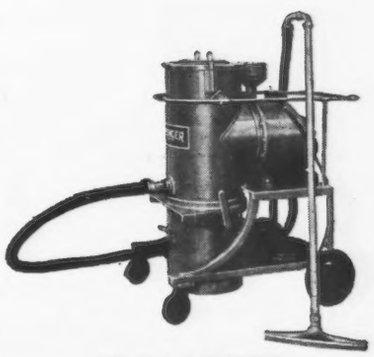

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Founders Group Elect I. Wagner President

Chicago

• • • **At the 49th** annual convention in New York of the National Founders Assn., I. R. Wagner was elected president of that association for the next year. As president of the Electric Steel Casting Co., Indianapolis, he brings to the industry years of experience in the foundry trade.

He has had complete experience in all phases of foundry work, having started in the business as a foundry employee and progressed to president of this company.

In Mr. Wagner's acceptance remarks, he embarked the NFA upon a program improving working conditions in the foundry and heartily endorsed the establishment of extensive training programs within the industry, for the shortage of manpower has been very acute in the casting field. His program for the promotion and development of improved manufacturing techniques is looked upon by many as the keynote for greater production in these vital products.

Unions Offer Plan To Absorb Anders' Army

London

• • • **Two British unions,** the Transport and General Workers' Union and the National Union of Agricultural Workers, are reported to have jointly decided to recommend a new solution to the problem of how to employ the 160,000 Poles in General Anders' army.

They are going to suggest to the Trade Union Congress General Council that each industry should be asked to take a quota which would be worked out on a percentage of the British workers employed. The object of this plan is to distribute the Poles fairly throughout industry instead of trying to force them on mining, agriculture and building which are particularly short of labor. These three industries have already written to the general council saying that they have decided against having the Poles in their respective industries, but it is felt that should the quota suggestion be adopted they would be prepared to take their share of Poles provided other industries did the same.

London Economist

[CONTINUED FROM PAGE 139]

and from a great excess of demand over supply of goods and services has pinched certain groups with considerable violence. Large numbers, including many white-collar workers, professional persons and rentiers, have had a lesser increase in their incomes than their cost of living. These groups are being pinched out of the market. The jump in retail prices at the time of decontrol provoked extensive signs of buyers' resistance.

Third, labor-management relations are not conducive to maximum production and employment. Strikes are frequent, and there is extensive evidence that the productivity of labor is somewhat below prewar levels. This may, indeed, be a part of a worldwide postwar malaise; but that does not make it harmless, and its effects have been aggravated by the frequency with which, when unions and employers have been unable to reach an agreement, a strike is called, in effect, against the government—and the government yields. There is no apparent basis for hope that labor-management relations will soon improve enough to permit the maximization of production or the reduction of costs.

Fourth, assets are so widely discounted that incentives to enterprise are much in question. Shares in existing business can generally be purchased on the market for less than their book values and substantially less than it would cost to reproduce the properties. The same phenomenon exists in the asset of skill. Laborers with little or no training frequently command wages in excess of teachers and other professional persons who have had to invest much time and money in training.

Fifth, widespread concern exists that productive capacity is in excess of the demand for goods and services which can be sustained over any considerable period. Evidence for this is adduced by the rising level of inventories in many lines. While these are not high in relation to current sales and represent largely partly finished goods which cannot be brought to completion because of the lack of some bottleneck part, any slackening of

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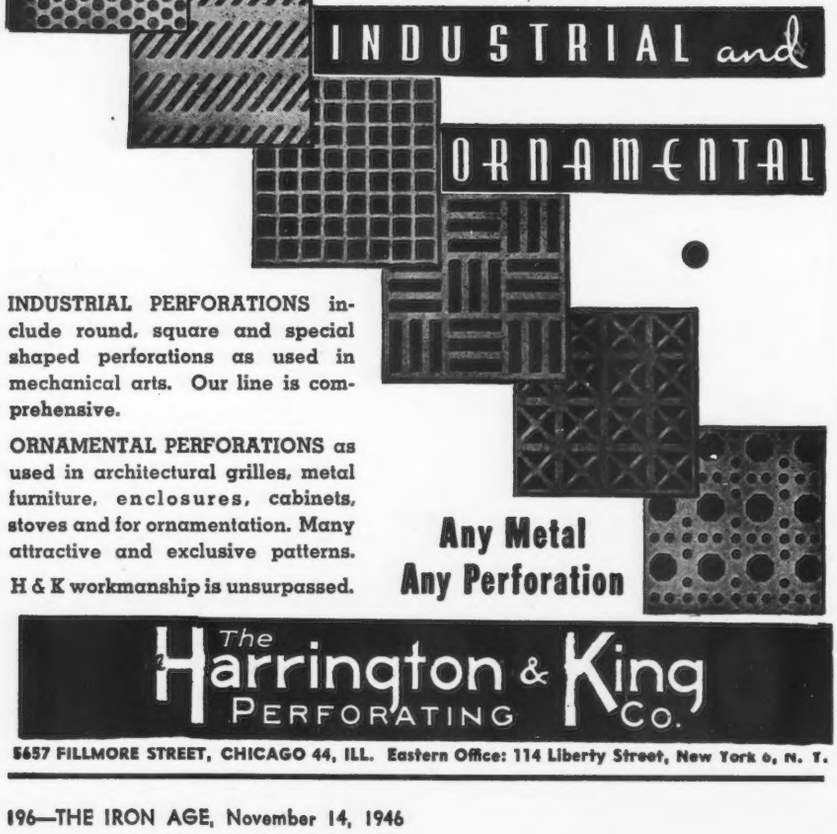

INDUSTRIAL PERFORATIONS include round, square and special shaped perforations as used in mechanical arts. Our line is comprehensive.

ORNAMENTAL PERFORATIONS as used in architectural grilles, metal furniture, enclosures, cabinets, stoves and for ornamentation. Many attractive and exclusive patterns.

H & K workmanship is unsurpassed.

Any Metal
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The Harrington & King PERFORATING Co.

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demand would make these working stores of goods appear excessive.

(4) Up to the present, the high level of business activity has rested largely upon an extraordinary boom in perishable consumer goods. The fore durable consumer goods, such as automobiles and housing, as well as heavy producers' goods, though in great demand, have contributed to a far lesser extent since their production has been frustrated by strikes and shortages. If a high level of activity is to be sustained, boom-like levels must presently be reached in these heavier consumer and producer items, which cannot be done without the solution of production and labor problems that have so far proved intractable.

(5) The weight of taxation is heavy. Government is currently taking $40 billion of a national income of about $170 billion. The weight of this burden adds discouragement to incentives in the same way as the unbalances listed above. And though there is much exhortation both within and without the government to reduce expenditure, the demands of national defense, of social services, of interest on the debt and of government administration in a most complex economy make significant reductions exceedingly difficult.

(6) At the same time, the weight of government intervention and regulation in the process of production and trade is considerable. Government has a hand in far more areas than ever before in peacetime. And even the proponents of centralization admit that as yet it is not an experienced hand, nor is it likely soon to become experienced.

(7) The course of foreign affairs is not so tranquil as to produce great confidence that the future is attractive for enterprise. Indeed, the extremely drastic decline in the stock market of Sept. 3 started at the instant that extracts from the belligerent Yugoslav note appeared on the news tickers in New York. The wave of collectivization, sweeping over every country in the world, makes the position of relatively unfettered private enterprise in the United States an uncomfortable one, even without more catastrophic international developments.

(8) A psychology of pessimism and obduracy regarding many of the country's problems has wide currency.

(9) Finally, at full circle, is the

blunt fact of the stock market decline. By the millions, Americans feel poorer as they know their securities will bring less in the market, as profits they thought they had have evaporated. And the raising of new capital for enterprise has been curtailed.

Such are the nine pillars of apprehension, the nine ailments on which many base a diagnosis of economic ill-health.

What, then, are the characteristics which suggest good health? What is the basis for confidence that high income and high employment will be long sustained in the United States?

Nine of these are evident.

(1) Goods and services in the United States are in tremendous demand. During the long war years, when many items were unobtainable or in short supply, American consumers and producers alike accumulated demands, many of which were and are urgent, which had to be deferred. This is a worldwide phenomenon, and even though the attrition in the United States was far less than in many other countries, the imperative demand for fulfillment is none the less real. It runs from clothes and food to the heaviest kind of producers' capital equipment. In face of the large current sales, the expanded inventory totals in practical observation are small and inadequate.

(2) The deferred and current demand is implemented by a pervasiveness of monetary purchasing power entirely unprecedented. American consumers had liquid assets prior to the war of about $50 billion and now have about $130 billion. The liquid assets and liquidity of business concerns have likewise enormously increased. This enormous exercisable monetary call on goods and services is more widely distributed in the economy than ever before. Prior to the war 10 pct of the families of the country possessed 90 pct of the liquid wealth. But during the war this inequality, while not removed, was greatly lessened: 10 pct of the families now have only 60 pct of the liquid wealth.

(3) Perhaps the greatest evident cause of business decline has been largely eradicated. Every slump which the United States has experienced has been associated, certainly aggravated, and in the

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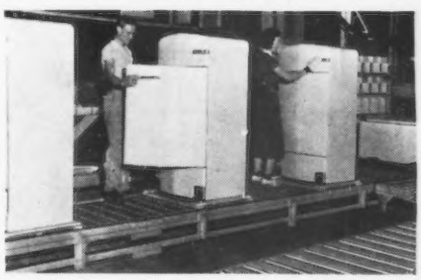
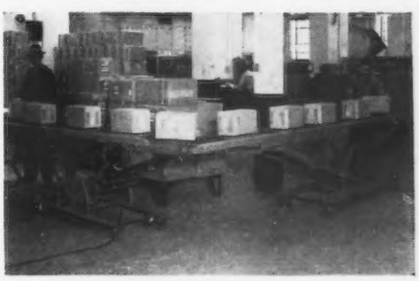
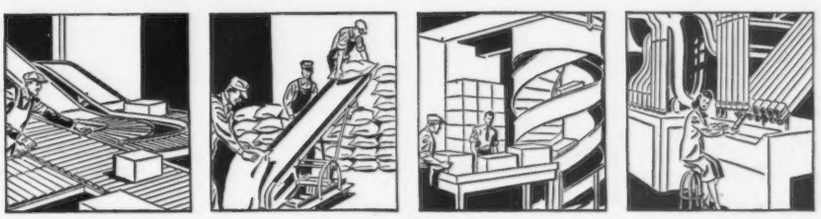


PRODUCTION LINES
Slat type conveyor used to speed assembly and crating of refrigerators.



STORAGE AREAS
Portable "Handibilt" conveyors used as a continuous conveyor line in storage area.

LOADING PLATFORM
Oil drums leave the warehouse for loading into boxcars on gravity roller system.



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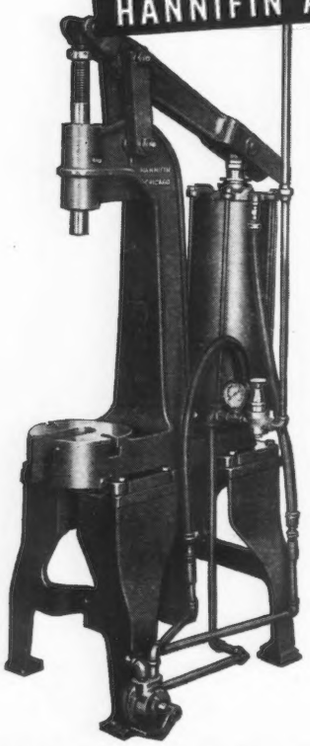
HANNIFIN AIR PRESSES



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Hannifin pneumatic arbor presses are designed for easier handling of a variety of pressing, assembly, and similar operations. Simple hand or foot operated control allows the operator to concentrate on the work, and uniform production can be consistently maintained. Hannifin Presses are built in a wide range of types, capacities 1200 lbs. to 36,000 lbs. Write for Pneumatic Press bulletin.

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conclusion of many students, caused by monetary instability. Inevitably business and personal debts rose rapidly during periods of business expansion and were monetized through bank lending and investment. Inevitably expansion encountered an exhaustion of credit sources, and in the subsequent decline, the volume of money shrank drastically through debt liquidation, debt default, and bank failure. In the expansion of recent years there has not been an expansion of private debt; indeed, the total is scarcely as large as prior to the war. The monetary expansion has been based entirely upon the public debt. This will not be rapidly repaid nor will it be defaulted. This country, therefore, has a supply of money deflatable only within narrow limits.

(4) From the war period and the depression before it, there has accumulated a mass of technological and scientific discovery which dwarfs the imagination. No one can yet assess it and no one has even found a means to try. Yet a catalog of scientific discovery and development, sufficiently far advanced to have been commercialized or about to be commercialized, encompasses virtually every item produced in the United States.

(5) The profitability of enterprise, arising from the economies of large volume and the savings in technology, is very high in most lines except railroads, despite the squeeze on the profit margin by higher costs and the tax collector. Even if the profit per item is far less, the aggregate dollar profit on the far larger volume of sales is still, with few exceptions, favorable.

(6) The government of the United States has accepted—or had forced upon it—responsibility for economic welfare and the maintenance of high employment. This responsibility is implemented by numerous statutes. Undoubtedly the hand of government is inexperienced in these respects, and results may be sometimes like those of a bull in a china shop. But certainly and beyond doubt, government efforts of an anticyclical and antidepression nature will in the future be made, and more vigorously and more promptly than in the past.

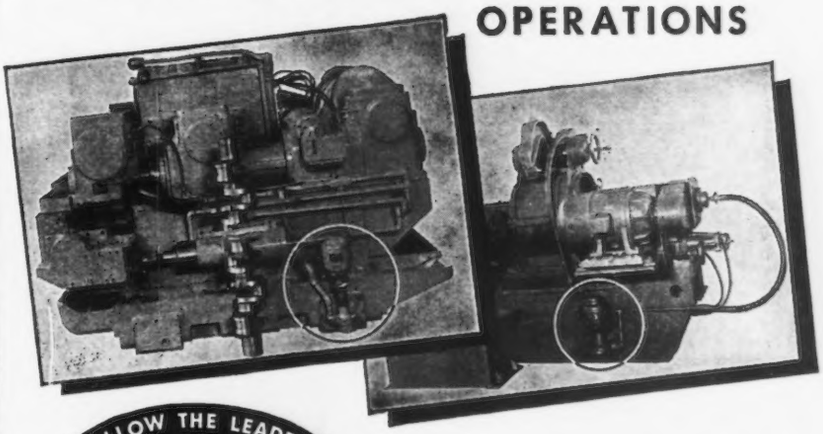
(7) The labor-management relationship, while unhealthy now, need not remain chronically so. The

rapid growth of the labor movement over the last decade and a half has brought to the top labor leaders in many cases lacking both experience and judgment. The rank and file, furthermore, have, as yet inadequate experience in collective procedure. Management in its turn similarly lacks experience and the same is obviously true of government in its role. But this lack is clearly recognized by the more thoughtful members of all groups, and major efforts are under way to find the techniques and processes or reconciliation and orderliness. Despite the prominence of labor stoppages in domestic and international news dispatches, a very large number of firms and industries experience relations which are satisfactory even if not without irritants. The low levels of productivity represent postwar weariness and conform to the historical pattern which, if followed, should presently produce an uptrend. Indeed, there are now frequent reports of improvement.

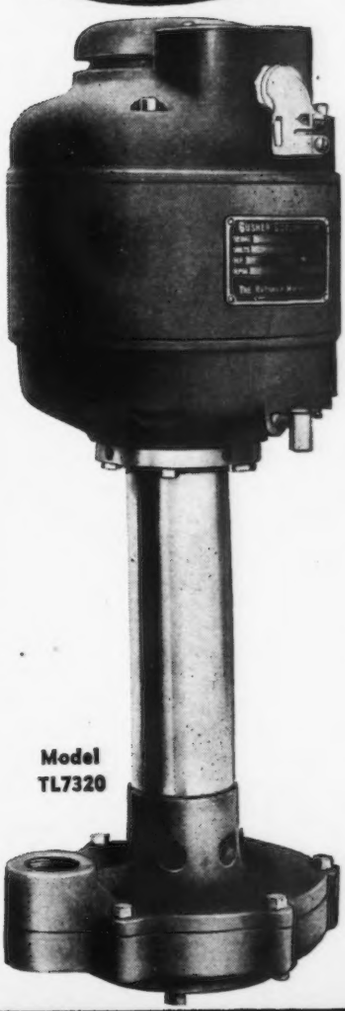
(8) The Republican victory does not alter much the already weakening alliance between the more extremely predatory pressure groups. A dimunition of excesses may be in prospect. The marriage between conservative southerners and big-city machines is encountering difficulties. The association between urban machine politics, the labor movement and farmers is cracking. These alliances, which have dominated the American political scene for a decade and a half and have purposely or inadvertently burdened the productive processes with some restraints and restrictions now generally regarded as inordinate are coming into internal opposition.

(9) Finally, the demand for goods and services from abroad may be long sustained. The existance of large demands both ways is unquestionable. The financing of imports presents no problem if domestic production can be sustained and if materials are available abroad. The financing of foreign demand on the United States can draw on the $15 billion of foreign assets in this country, the Monetary Fund, the International Bank, the Export-Import Bank, as well as on private loans. Most basically of all it can be financed by large American imports. If war, or a condition so near war as to impair trade, can be avoided, and

SPEED CUTTING OPERATIONS



FOLLOW THE LEADERS USE "GUSHER" COOLANT PUMPS



Model TL7320

WITH RUTHMAN GUSHER COOLANT PUMPS

To speed production on metal cutting operations, these leading manufacturers of machine tools turn to Ruthman Gusher Coolant Pumps.

Illustrated above left is a "MELLING" TYPE CRANKSHAFT CONTOUR TURNING LATHE, made by the Crankshaft Machine Company. It is equipped with a 1/4 H.P. MODEL SLO-7230 RUTHMAN GUSHER COOLANT PUMP. At the right is a SPECIAL "GARDNER" DOUBLE SPINDLE GRINDER with a 1/4 H.P. MODEL 11022 SHORT GUSHER COOLANT PUMP.

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*Photos courtesy The Crankshaft Machine Co. The Gardner Machine Co.

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The exceptional detergent properties of the balanced Oakite material thoroughly removed mill oil and smut. The follow-up surface conditioning and chromic-acid dips were more uniform, thoroughly covered the work, inside and out. And the daily saving on hand labor boosted the over-all job profit!

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if cost-price relationships can be brought into line, trade could flourish.

The surveys of economists' opinions show an impressive preponderance of the view that a readjustment can be expected before long, but that it will be milder than the slump of 1921 because the monetary instabilities that played so large a part then are not present now. As for when the onset can be expected, it can be only said that if the bearish arguments have any validity at all, they ought to have demonstrated it long before the end of 1947.

Two Chapters of Scrap Institute Report On Election of Officers

Washington

• • • **The Institute of** Scrap Iron & Steel, Inc. has announced the results of recent elections of officers in the St. Louis and Northern California chapters of the institute.

Frank Tuschman, of the Steel Baling Co., East St. Louis, has been elected president of the St. Louis chapter of the Institute, succeeding Abe P. Ashner of St. Louis, who retired after serving 2 yr.

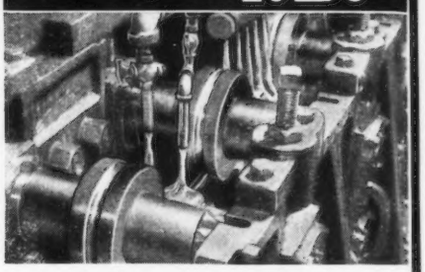
Sam Lefton, of B. Lefton & Sons Iron & Metal Co., St. Louis, was elected first vice-president; Charles Forcheimer, Jack R. Forcheimer & Son, St. Louis, will be second vice-president; Sol Mack, Frank Mack Co., Edwardsville, Ill., was chosen third vice-president.

Sidney Grossman of Grossman Iron & Metal Co., St. Louis, was re-elected secretary-treasurer, and Abe P. Ashner was made chairman of the executive committee.

Marshall A. Shapiro, of California Metals Co., Oakland, president of the northern California chapter of the Institute of Scrap Iron & Steel, has been re-elected to that post at a meeting of the chapter Oct. 23.

Other officers who will continue to serve in the same capacity are: Louis Rothenberg, American Iron & Metal Co., Emeryville, vice-president and Harold T. Levin, Salco Iron & Metal Co., San Francisco, secretary-treasurer.

Guard Against T.B.*



***TOTEBOX BLIGHT**

NEW WAY TO LICK COOLANT CORROSION AFTER MACHINING...

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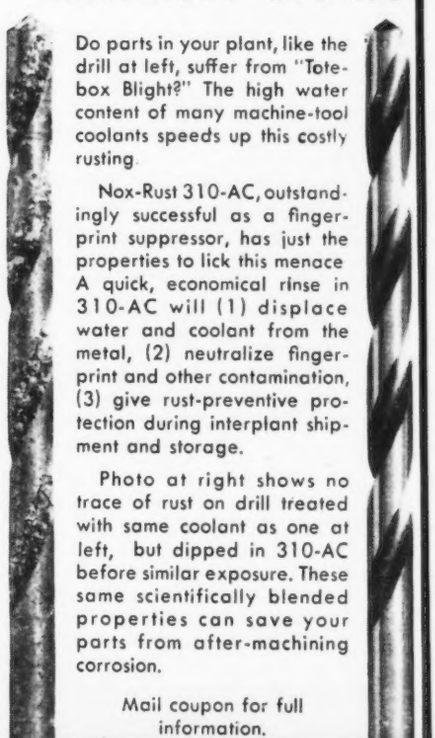

Do parts in your plant, like the drill at left, suffer from "Totebox Blight?" The high water content of many machine-tool coolants speeds up this costly rusting.

Nox-Rust 310-AC, outstandingly successful as a fingerprint suppressor, has just the properties to lick this menace. A quick, economical rinse in 310-AC will (1) displace water and coolant from the metal, (2) neutralize fingerprint and other contamination, (3) give rust-preventive protection during interplant shipment and storage.

Photo at right shows no trace of rust on drill treated with same coolant as one at left, but dipped in 310-AC before similar exposure. These same scientifically blended properties can save your parts from after-machining corrosion.

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British Atom Expert Planning New Machine For Nuclear Research

London

• • • **Prof. M. L. Oliphant,** British atom bomb expert, is reported to have said that in the physics laboratory at Birmingham University, where he is professor of physics, the foundations were being laid for a gigantic new machine for use in nuclear research.

He said that with this machine, which will have a magnet of 30 ft in diam and will weigh about 1000 tons, it is hoped to attain energies of about 1,000,000,000 v. Among the problems to be solved, for which these enormous energies were required, was that of discovering the nature of the "glue" which held together the protons and neutrons forming the atomic nucleus.

When asked who was going to pay for the new machine, Prof. Oliphant said that at present Britain was tremendously interested in atomic energy, and "for anything vaguely connected with it, increasing knowledge and enabling other people to improve the exploitation of atomic energy, they are willing to help."

In the new machine, atomic particles would be made to move continuously in a circle 30 ft in diam gaining energy as they did so. It was not known whether the required energy would be achieved with the machine. It is understood that by disturbing the nucleus of atoms substances could now be transformed into other substances. Lead could be changed into gold in the laboratory, though not on an economic basis because the costs of producing the energy were higher than the value of the result.

Sets Up British Agency

London

• • • **A British** purchasing agency has been established at Minden, Germany, under the sundry materials branch of the British Board of Trade for the purpose of centralizing all exports from Germany to the United Kingdom, except timber and scrap metal.

This organization will maintain the closest liaison with the Control Commission. All purchases are on government account and distribution will be made through the Board of Trade.

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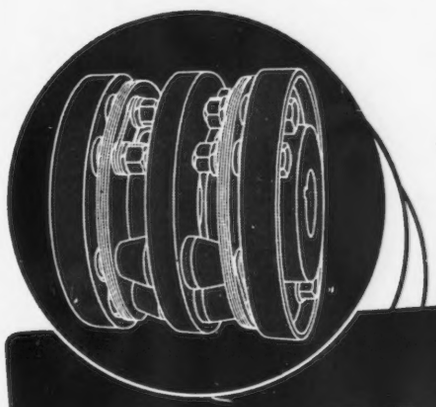

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BACKLASH, FRICTION, WEAR and CROSS-PULL
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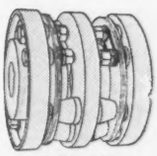
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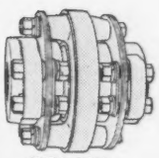
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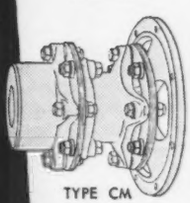
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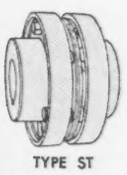
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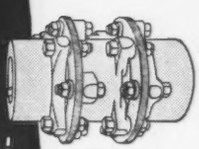
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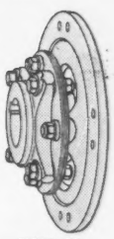
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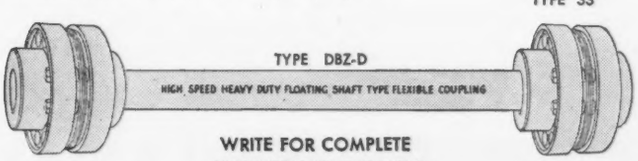
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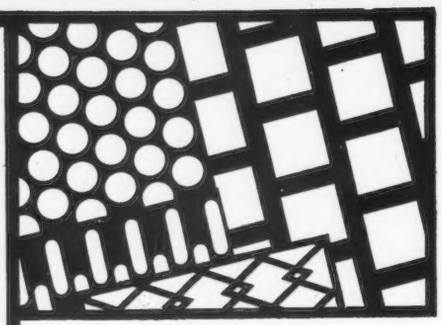

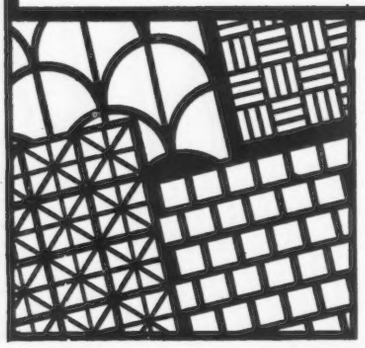

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August Production Of Ingots, Castings In Canada Hits New Low

Toronto

• • • **Canadian production** of steel ingots and castings broke through to a new low monthly record in August, as a direct result of the steel strike that reduced operations by the Steel Co. of Canada Ltd., Hamilton, to less than 60 pct of normal capacity, and brought total suspension of production to Algoma Steel Corp., Sault Ste. Marie, Ont., and Dominion Steel & Coal Co., Sydney, N. S., from the middle of July to the end of September.

For August output of steel ingots and castings amounted to 88,729 net tons compared with 224,928 net tons in the corresponding month last year. The month's output included 82,707 tons of steel ingots and 6022 tons of steel castings. Steel furnace charges in August included 26,765 tons of pig iron; 27,055 tons of scrap of consumers' own make, and 49,847 tons of purchased scrap.

For the first 8 months of the year cumulative production of steel ingots and castings totaled 1,674,282 net tons, which compares with 2,049,707 tons for the corresponding period of 1945 and 1,993,756 tons in the 1944 period. Following are comparative monthly figures for 1946 in net tons:

1946	Steel Ingots	Steel Castings
January	236,479	8,144
February	226,373	7,620
March	240,589	8,528
April	239,463	8,056
May	251,697	7,929
June	208,296	6,565
July	130,754	5,160
August	82,707	6,022
Total 8 Months	1,616,258	58,024

OPA Hikes Price On Tack Quality Plate

Pittsburgh

• • • **The increase** authorized by OPA of $6.50 a net ton on tack quality plate, effective at all hot-rolled sheet basing points, is less than two thirds of what the industry, consisting totally of Carnegie-Illinois Steel Corp., and Mahoning Valley Steel Co., had requested.

The request for a price increase on tack quality plate had been for $9.00 a ton plus placing the plate

on a straight Pittsburgh basing point, so that freight absorption from other hot-rolled sheet basing points would be eliminated.

With Mahoning Valley Steel Co. having been purchased by General Electric Co., the possibilities are that the plant will no longer produce tack quality plate, and Carnegie-Illinois Steel Corp. will be the sole producer. The new price is regarded as insufficient because the freight absorption approximates the difference between the selling price and the break even point.

Total production of this quality plate, made exclusively on hand mills, is insignificant when compared to total flat-rolled steel output, totaling somewhere in the neighborhood of 20,000 tons a yr.

Steel Complaints Made

Paris

• • • **The President** of the Chambre Syndicale de la Siderurgie has sent a letter to the French Minister of Finance complaining that the recent increases in prices of steel products are insufficient to support costs of production throughout the industry.

He mentioned that for Thomas rolled products the price has been fixed at 6400 francs ($53.33), whereas the sum necessary to cover production costs is 8400 francs ($70), and that this price was still much lower than foreign prices for comparable products which in Belgium and Luxemburg for instance ranged from 8500 francs ($70.83) to 8900 francs ($74.16).

U.K. Tin Stocks Decline

London

• • • **United Kingdom** stocks of tin ore at the end of September amounted to 9018 tons as against 10,134 tons at the beginning of the month. British Ministry of Supply figures reveal that stocks of tin metal held by the ministry at the end of September were 9786 tons compared with 10,379 tons at the beginning of the month, while stocks held by consumers at the end of September amounted to 4376 tons. No tin metal was imported during the month, but production is shown as at 2807 tons.

Deliveries of tin to United Kingdom consumers during September amounted to 2997 tons and deliveries for export were 300 tons.

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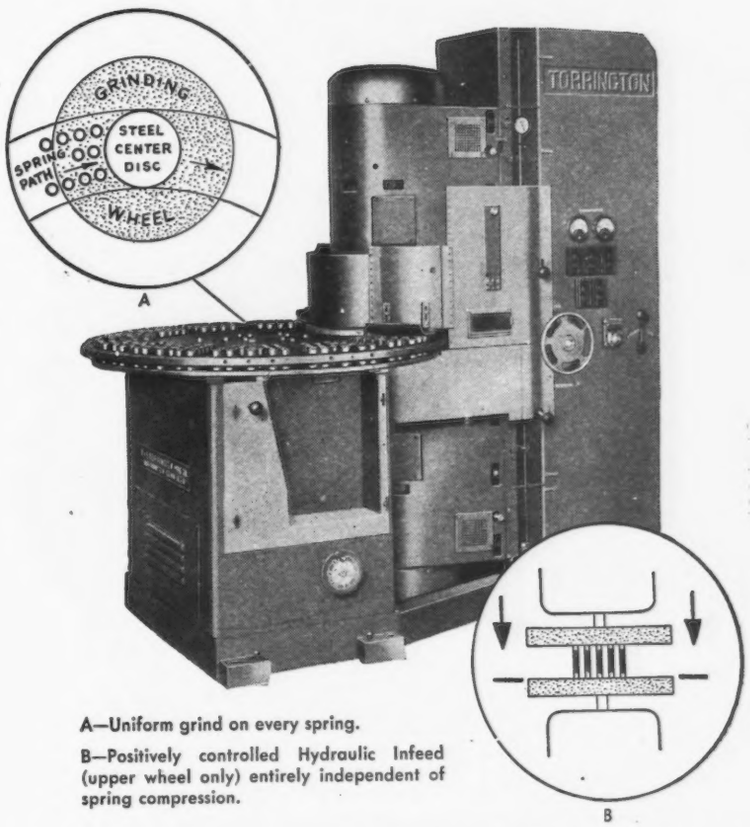

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SPECIFICATIONS

Spring Capacity: Lengths ⅝" to 16"; diameters ¼" to 7"; wire diameters .040" to .375".

Grinding Wheels: Diameter 24"; maximum usable abrasive 2½".

Grinding Feed: .010" to .100" per minute.

Work Carrier Wheel Speeds: 4 to 16 revolutions per hour, or 1.1 to 4.5 revolutions per minute.

Available Work Carrying Area: (including spring holders) approximately 850 sq in.

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Canadian August Pig Iron Production Hits Record Low for Year

Toronto

• • • **Production of pig** iron and ferroalloys in Canada for the month of August again revealed the effects of the steel strike with output registering a new low record for the year and also showing a low monthly total for about 10 yr. Pig iron output at 46,494 net tons in August compares with 139,812 tons for the same month last year, and for the month under review 34,027 tons of basic iron was made and 12,467 tons of malleable iron, while no foundry iron was reported.

During August five out of a total of 14 furnaces were in blast, and blast furnace charges included 86,705 tons of iron ore, 5503 tons of mill cinder, scale, sinter, etc., and 2112 tons of scrap iron and steel.

For the first 8 months of this year, cumulative production of pig iron totaled 986,989 net tons as compared with 1,232,162 tons for the corresponding period of 1945, and with 1,266,979 in the 1944 period.

Output of ferroalloys in August fell to 6013 net tons from the 15,668 tons reported for the same month last year and included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus. For the 8 months ended Aug. 31, cumulative production of ferroalloys totaled 81,247 net tons, as against 130,090 tons in the 1945 period and 124,558 in 1944.

Following are comparative monthly production figures for pig iron and ferroalloys in net tons:

1946	Pig Iron	Ferroalloys
January	143,685	10,878
February	143,171	10,872
March	157,936	8,405
April	142,240	13,083
May	159,101	14,069
June	129,890	11,684
July	64,472	6,243
August	46,494	6,013
Total 8 Months	986,989	81,247

British to Recruit Labor

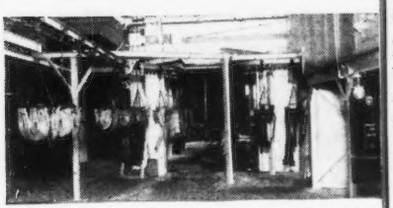
London

• • • **Britain's Ministries** of Labor and Supply are launching a national campaign to recruit labor for the iron foundries in order to break one of the worst bottlenecks in the housing program. Prewar there

Silicone News

DC SILICONES

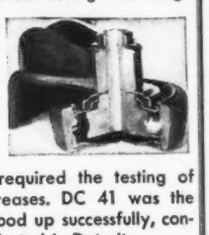
DC Silicone Grease Solves Problem of Lubricating Conveyor Bearings



Photo, courtesy Mechanical Handling Systems, Inc.

Conveyor systems, like other mass production techniques, are generally taken for granted—except by such specialists as Mechanical Handling Systems, Inc., of Detroit. They design conveyor systems for automotive companies which will not fail even though trolley wheels travel through alkali and chromic acid fumes, paint spray booths, and through ovens operating at 400°-450° F.

Even with triple-sealed trolley wheels conventional greases failed during this tough cycle—partly because one absolute requirement is that no grease or oil be permitted to drop on painted parts.



Recently, trouble in an automobile plant in California required the testing of high temperature greases. DC 41 was the only grease which stood up successfully, confirming the tests conducted in Detroit.

Once lubricated with DC 41, bearings in the Monoveyer system illustrated above are running smoothly after 60 days of conveying metal parts through alkali, Bonderite and chromic acid spray chambers, paint spray booths and 450° F. ovens.

Information about DC 41 and other silicone greases is given in data sheet No. S 7-2.

SILICONE LUBRICATING FLUIDS. DC 550 and DC 710 are available for lubricating machinery operating at very high or low temperatures. DC 550 is described in data sheet No. S 17-1. DC 710 in data sheet No. S 18-1.

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were about 140,000 process and maintenance workers employed in the industry whereas now there are only 118,400. Altogether 20,000 men are needed if the iron foundries are to be fully staffed, but the government is aiming first at recruiting 10,000 workers, mainly unskilled, for the light castings branch, upon which housing progress depends.

Production now amounts to 2.8 million tons a year, which is just over two-thirds of the prewar total. Output is increasing but not in proportion to requirements. At the end of 1945 total requirements of castings were estimated at 744,265 tons whereas present requirements amount to 982,552 tons.

Detroit Steel Group Elects New Officers

Cleveland

• • • **The Detroit Chapter** of Steel Products Warehouse Ass:n., host for the SPWA annual convention Nov. 14 and 15, re-elected Laurence J. Carolin, Stanton Steel Co., as regional chairman and head of the convention reception committee, at its quarterly meeting recently.

Other officers elected to serve with Mr. Carolin for the coming year are: Bud Bedell, Prain Steel Corp., vice-chairman; S. H. Greenbaum, Bernard Epps & Co., secretary-treasurer; and Joseph Gendelman, National Sheet Steel Co., trustee.

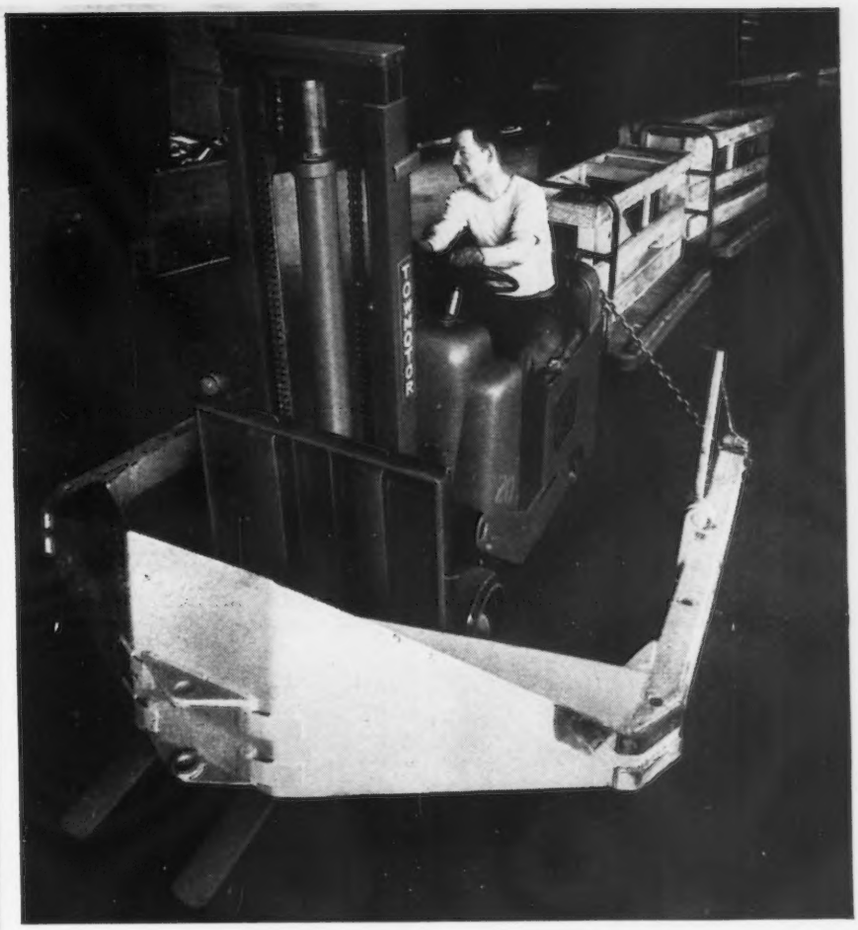
Together with those elected by the Cleveland, Chicago and Mahoning Valley chapters, these officers will be certified to the annual meeting convening in Detroit at the Book-Cadillac in November.

Increase Alsifer Prices

New York

• • • **The Vanadium Corp.** of America has announced an increase in the price of alsifer effective Nov. 1. The cost of production of this ferroalloy, containing 20 pct aluminum, 40 pct silicon, 40 pct iron, is said to have increased because of the increased cost of remelted aluminum.

Alsifer is sold now on a contract basis per lb, lump size, F.O.B. Niagara Falls at: carload lots, 6.25¢; ton lots, 6.75¢; less ton lots, 7.25¢.



Handling is *HEAVY* at the Crossroads

1900 TONS of LCL freight, ranging from cartons of candy to bulky tombstones, shoot through the Galewood, Illinois, transfer station of The Chicago, Milwaukee, St. Paul and Pacific Railroad Company every 24 hours. Unloading, classifying, checking and reloading an enormous variety of freight in time to meet scheduled train movements calls for fast, accurate handling . . . the kind that a Towmotor Fork Lift Truck can provide.

Used chiefly to unload and load boxcars, Towmotors also serve as "trouble-shooters" to daily expedite hundreds of other difficult handling operations. Whether it's a load of fragile china or an 1800 lb. road grader yoke, Towmotor handles it quickly, easily and safely, reduces handling time and labor as much as 75%, often triples boxcar capacity through high stacking of cumbersome loads.

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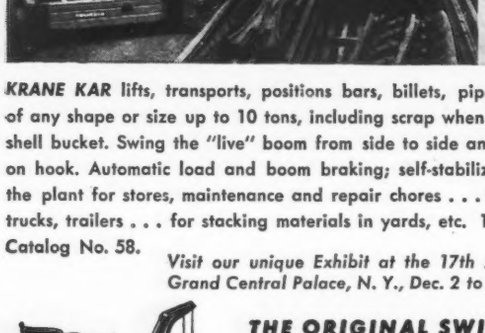

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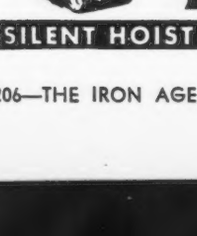

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Welsh Economy Will Be Integrated With All Of Britain, Cripps Says

London

• • • **Sir Stafford Cripps,** President of the Board of Trade, and Aneurin Bevan, Minister of Health, during the debate in the House of Commons on the government white paper on Wales, emphasized the need for Welsh economy to be a part of that for the rest of Great Britain.

"In taking industry out of crowded England where there is a shortage of labor and placing it in Wales where there is an excess of labor we are doing exactly what is happening in other development areas," said Sir Stafford. "This is essentially a part of national planning and not local planning."

The government plans to build some 200 new factories in South Wales, of which about two thirds will be state financed, providing work for 70,000 to 75,000 men and 50,000 to 55,000 women. If they are not delayed by shortage of materials, particularly steel, the government hopes to complete its program within two years.

With regard to the ports of South Wales, Sir Stafford said that they were largely constructed for and always relied on the export of coal, and it was therefore extremely difficult to see what could be done until such time as coal exports revived. He hoped that when industrial development was completed the new factories would provide both an export and import trade through the South Wales ports.

Britain May Increase Czechoslovak Imports

London

• • • **Mr. H. A. Marquand,** Secretary of Britain's Dept. of Overseas Trade, who has recently returned from visiting the Prague Fair, said during a speech at a luncheon given by the Czechoslovak Economic Assn. in London that he thought Great Britain was reaching the stage of being able to make a wider and more enduring arrangement for importing Czechoslovakian products.

Prewar Britain's annual imports from Czechoslovakia amounted to nearly $24 million, and it is hoped next year to reach a gure not too

far short of this total. Most of the imports will be necessities, but a certain proportion will be non essentials. Mr. Marquand said that when he was in Prague he had had discussions with officials over the purchases in the reverse direction which Czechoslovakia could make with the sterling she would be earning. He went on to say that he was looking forward to the day when Britain could buy what she needed or wanted on commercial terms without the intervention of governments. "I am no disbeliever of state enterprise, but there are limits in which detailed state intervention gives you no long-term advantage. You can dispense with the intervention of officials as long as you lay down a broad economic plan."

Surplus Auto Parts Sold

Chicago

• • • **The WAA has** begun taking orders against a national surplus automobile parts inventory of over $270 million. More than $1,587,000 worth of automotive parts were sold to World War II veterans and other eligible buyers on the first day of the sale. Stanley B. Adams, regional director, said the offering here was part of a nationwide drive to liquidate the inventory of 11,000,000 automotive parts now held by WAA. Orders placed here are forwarded to Detroit to be filled. Parts on sale are of standard makes and many can be used interchangeably for either trucks or automobiles. The parts range from small lock washers to complete engine assemblies. The minimum order that can be taken by the agency is $500, except in cases where the material is necessary for a vehicle that is out of service. Veterans may be allowed maximum discounts of 75 pct from list price.

British Coal More Costly

London

• • • **Mr. Shinwell, Britain's** Minister of Fuel and Power said in the House of Commons that the total cost of production of British coal disposed of commercially was in 1913 $1.67, in 1921 $5.66, and in 1945 $6.39 per ton. Figures for profits and loss were 32¢ profit, 60¢ loss, and 31¢ profit respectively, after taking into consideration payment in the coal charges account of 16¢.

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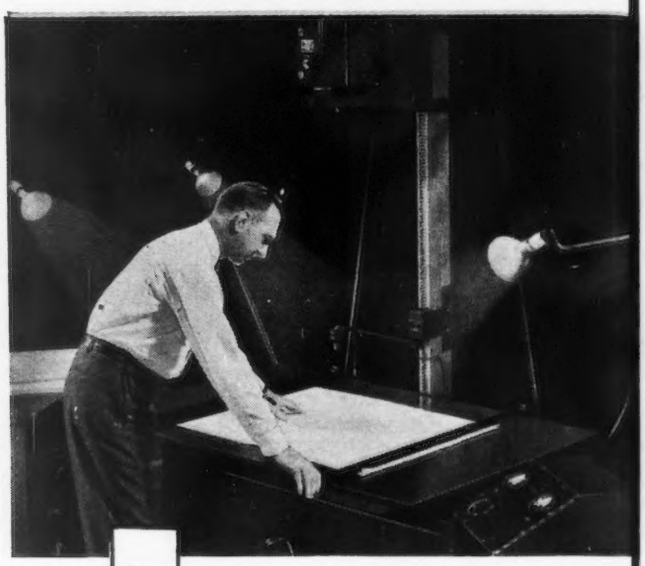
☑ Check them over to see how many can be adapted to your needs... to help you increase quality, decrease costs



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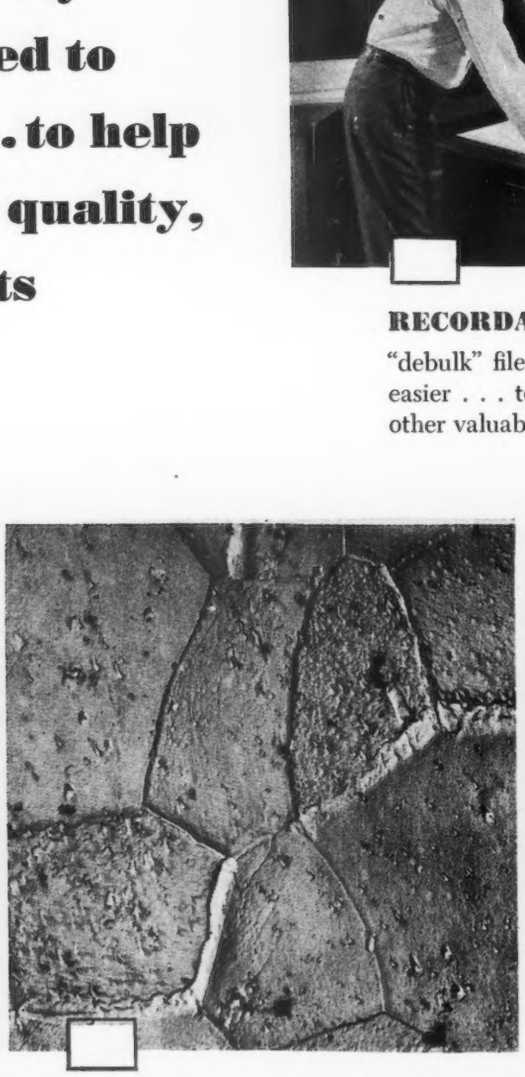

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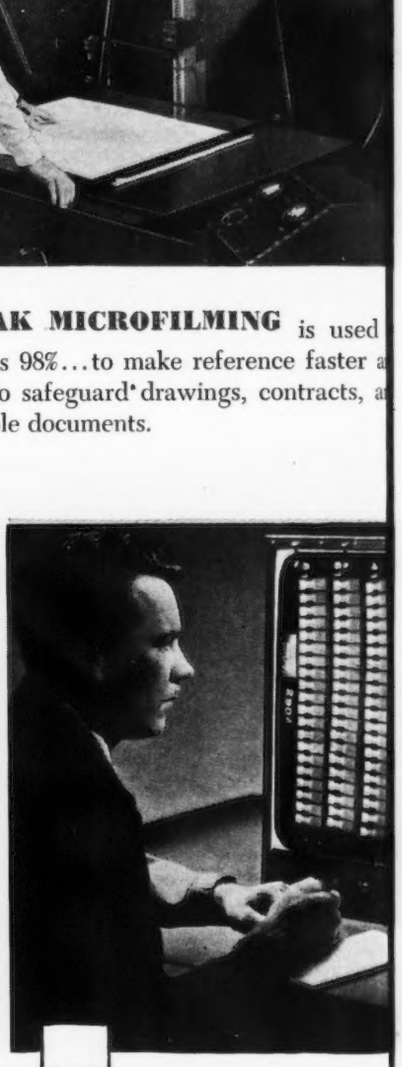

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